In **This Issue:** The Journal of Electricity's Thirty-one Years of Service to the West

INVEST IN LIBERTY BONDS

JOURNAL OF ELECTRICITY

VOL. 41 NO. 8 SAN FRANCISCO, OCTOBER 15, 1918 PER COPY, 25 CENTS

The front is protected by a wire guard — this can be easily removed when the copper reflector needs cleaning.

The back is always cool and safe. There is a dead air-space between the steel back and the copper reflector.

The New Improved "Majestic" No. 7

The Handsomest and Best Selling Electric Heater on the market

Price complete with 8-foot cord and plug, $9.00
With on-and-off switch attached to cord, 75c extra.

There are 8 other designs of "Majestic" Electric Heaters—All Good Sellers.

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The New Improved "Majestic" No. 7

The Electric Heater without comebacks

The parabolic reflector is made of pure, burnished copper and cannot peel.

The "Majestic" is the original electric heater of its type upon which the U. S. Government granted patents.

Majestic Electric Development Company

656-658 Howard St. — Manufacturers and Patentees — San Francisco, Cal.

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Franklin Mazda Lamps

A Personal Message *to* Pacific Coast Electrical Men *from* Harry Holabird

If You Want to Sell More Lamps

here's my advice — Become an Agent for the Franklin Mazda and let us take hold with you **now** and build your lamp sales up. Here is a great, big, waiting opportunity — with plenty of steady certain profits.

Sell FRANKLIN MAZDA LAMPS

for these three reasons. 1. The lamp itself is perfect. That's why we have selected it from all the field. 2. Franklin advertising is the kind that gets across. Each month it helps in a practical way, with good ideas and folders, blotters, posters, window stuff that you can use. **Then**—3. It is supported right here on the Coast by Holabird Service. The stock is here, the dealer helps are here and we are working with you all the time.

Why can't we get together right now and boost your lamp income?

Write us today.

H. G. Holabird

HOLABIRD ELECTRICAL COMPANY

SAN FRANCISCO LOS ANGELES

Pacific Coast Representatives:

THE FRANKLIN ELECTRIC MFG. CO.

Hartford, Conn.

JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor — CLOTILDE GRUNSKY, Associate

VOLUME 41 — SAN FRANCISCO, OCTOBER 15, 1918 — NUMBER 8

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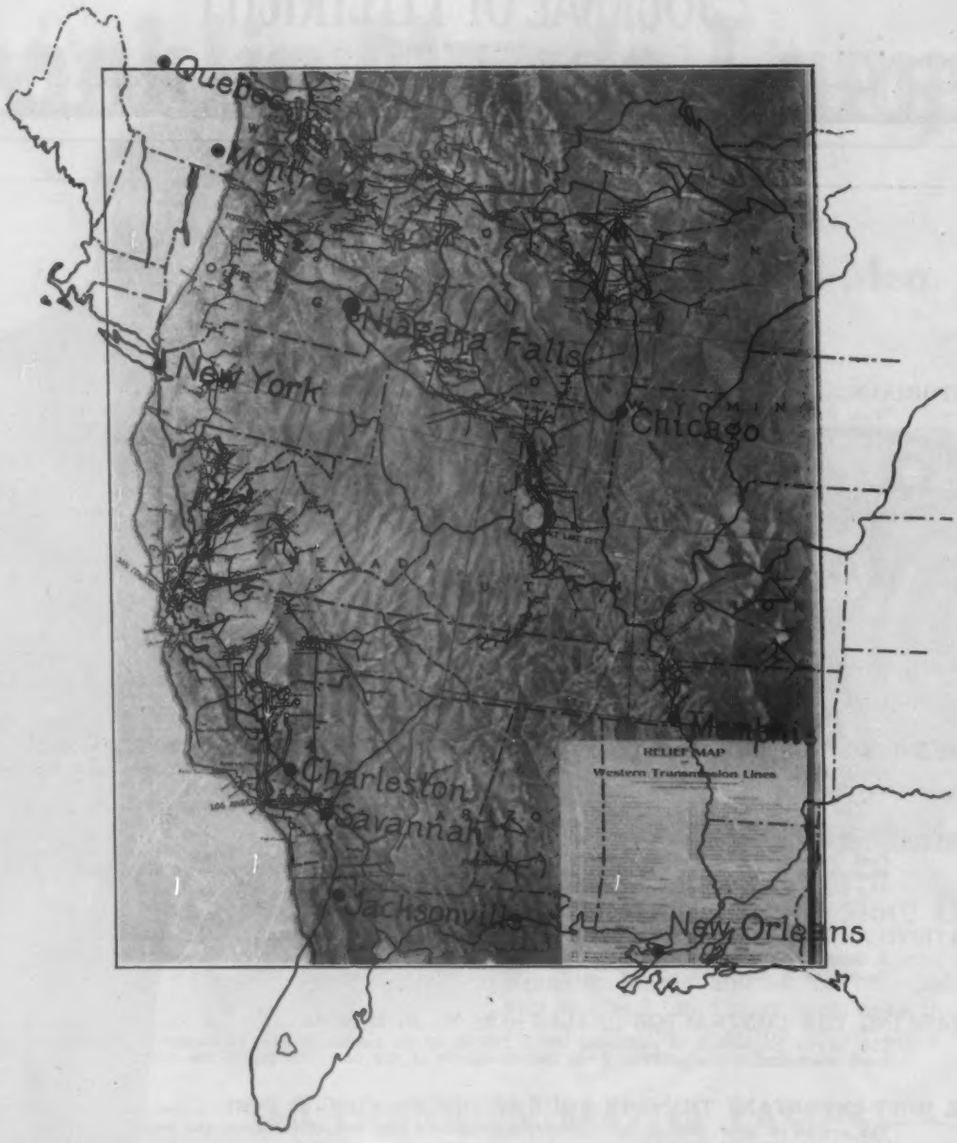

The Journal of Electricity

with this issue celebrates the completion of its thirty-first year of existence. It has fostered and nurtured an empire that today is without a peer in progressive development and with possibilities for the future almost beyond the vision of even the fondest dreamer of the era just completed.

A typical instance of the present high state of development in this section is the fact that its people now use electricity per capita, to a degree almost four times that of the per capita rate in the remainder of the nation, and yet, while the rate charged is nearly half, still the power company derives a revenue per capita of population equal to twice that received elsewhere. For full details of this statement see the editorial on the opposite page.

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JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 41 SAN FRANCISCO, OCTOBER 15, 1918 Number 8

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WITH President Wilson let us stand firm for the destruction of every arbitrary power, anywhere, that can separately and of its single choice disturb the peace of the world. Standing upon this platform, let us build the after-the-war supremacy of American international engineering and commerce upon such broad lines of international helpfulness that future war will be impossible. Such a task will demand the perpetual checking of the invasion of right both at home and abroad. Are you ready to dedicate your life ideals to this service?

Not a Prophecy but a Visualized Fact

Picture yourself in New York City looking to the south and viewing a string of vast transmission lines extending southward along the Atlantic Coast across New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and into Jacksonville, Florida. Then imagine this same vast network extending westward across Pennsylvania, Ohio, Indiana, Illinois, Wisconsin and almost to Minneapolis in Minnesota. In such a vision of pulsating energy from Jacksonville, Florida, through New York City to Minneapolis in the Northwest one may grasp the magnitude of hydroelectric development west of the Rocky Mountains where still remain undeveloped twice the potential power, developed and undeveloped, of the entire remaining portion of the United States.

It is estimated that a minimum of nearly nineteen million and a maximum of nearly thirty-seven million horsepower lie undeveloped in this section, so prolific in power possibilities.

Nowhere else in the world has the method electrical taken firmer hold of the populace or do greater possibilities for increased development of hydroelectric power exist. Interesting deductions showing this most favorable situation in the West, as compared with the remaining parts of the United States, may be gleaned from central station data that appeared in the Electrical World June 1 and March 23, 1918. Based upon the data thus given, the total central station income and total power generated in the United States from April, 1917, to March, 1918, inclusive, appears to be in round numbers as follows:

ANNUAL CENTRAL STATION REVENUE (APRIL, 1917-MARCH, 1918)

New England States	$ 55,062,900	
Atlantic States	182,524,700	
Central States	173,436,200	$411,023,800
Pacific Mountain States		64,834,400
	Total Revenue,	$475,858,200

ANNUAL CENTRAL STATION KW-HR. OUTPUT (APR. 1917-MAR. 1918)

New England States	2,189,086,600	
Atlantic States	9,589,842,100	
Central States	9,433,259,600	21,202,188,000
Pacific and Mountain States		5,331,619,600
	Total Kw-hr. Output,	26,533,807,600

It is estimated that the population of the Pacific and Mountain States in 1917, allowing 21% increase since 1910, must approximately be 6,700,000, while the population of the remaining parts of the nation was in 1917 93,300,000, making up a total of 100,000,000 people in all.

On this basis it is seen that since the total income of electric power companies for the West and for the remaining parts of the United States is respectively $64,834,400 and $411,023,800, the per capita expenditure is respectively $9.67 in the West as opposed to $4.40. Again, the total consumption of electric energy being 5,331,619,600 kw-hr. and 21,202,188,000 kw-hr. respectively, or since the West consumes with its population of but 6,700,000 quite approximately 25% of the electric energy consumed by the entire remaining 93,000,000 people in the nation, the per capita consumption is 800 kw-hr. as opposed to 227 kw-hr.—nearly four times the intensive use—striking evidence of the supremacy of the method electrical throughout the West.

A Workable Pattern in Power Development

In view of the present intensive development of hydroelectric power in the West combined with such unprecedented possibilities in new power development as set forth in the preceding editorial, to the thoughtful student there is but one ultimate solution of the water power situation in this section.

A glance at the vast transmission lines of the West shown upon the map that accompanies this issue of the Journal of Electricity brings to mind some very interesting reflections. In the first place these great high tension lines, threading as they do the productive valleys already served by giant transcontinental railroad lines, foretell the future possibility of railway electrification and the extended uses of electricity in the great industrial centers of the future in this section.

It takes little stretch of imagination to see these present lines replaced by high tension lines of 200,000 to 250,000 volts making possible the utilization of electric power by the millions of horsepower in the electrification of western railways and in the driving of wheels of industry in great industrial centers such as Great Falls, Butte, Spokane, Seattle, Tacoma, Portland, San Francisco, and Los Angeles.

The development of four typical power sites—The Dalles, the Pit River, the Feather River and the Big Creek—would make available at once over two million additional horsepower in districts where electric power is already finding such absorbing uses as to exhaust the present supply.

To develop such vast powers an outlay of money is necessary of such proportions as to make private financing an impossibility.

It would seem that the outcome of the entire problem is of such vital interest to the West that a partnership of all parties to the issue—the municipally owned, the privately owned and the government projected—might well be combined to the good of all into some profit-showing arrangement whereby the entire power system of the West might interconnect and jointly operate on a superbly extended scale of procedure.

To say the least, the time is ripe for investigation by all parties to the issue to see what is the best way to develop all the splendid water powers of the West, built upon such broad lines of constructive effort that a workable pattern will be evolved whereby hit-and-miss development will cease and all future development be undertaken agreeable to this workable pattern, looking toward the harmonious and economic development of the nineteen to thirty-seven million undeveloped water horsepower in the West.

A Town or Two Outside of New York City

With the rather surprising title "Your Town is Located in New York City" a prominent electrical paper, of national circulation, has devoted a full page in its September advertising columns to setting forth the fact that contractor-dealer problems encountered in every other locality of the United States are similarly experienced in New York City.

In some measure this is true. NewYork City is a wonderful combination of human effort and accomplishment that has called forth the admiration of the whole world in the spirit of enterprise and daring of its citizens.

In the humble life of American citizens who live west of the Rockies one or two problems are being solved in the electrical industry, however, that not even the great New York has ever known or experienced.

Indeed, it is questionable whether the majority of the problems that now perplex the contractor-dealer in the West can be solved by applications of methods in vogue in New York City. The vastness of this section of country, the dependence of our agricultural life upon water artificially applied, the open, free, out of door life of its citizens, and a host of other natural conditions make our development and problems to be solved of a wholly different nature.

The paper referred to is one of our most helpful contemporaries in its wholesome aid in building up a strong electrical industry in America. As a consequence the citation of this advertising page is in no manner to be construed as indicting the motives of our contemporary. It is, however, to be remembered in these days of national stress that not only are one or two towns not located in New York City but there is only one location for all—namely, in the United States of America.

Washing Machine and Women Salesmen

"Why doesn't the electrical store have a woman sell its washing machines?" was the gist of a recent conversation with a housewife who had set out to purchase one of these articles. It developed that she had gone into three establishments and had met with satisfaction in none. She wanted to know such reasonable things as how you get the water into the washer—do you have to carry it in a bucket? How is the water emptied? How can the washer be set up next to stationary tubs so that rinsing and bluing can be taken care of? Is the water from a hot water hydrant hot enough or must it be boiling? — and the like. In the first establishment (a dealer who has the reputation for up-to-date methods by the way), the clerk confessed to knowing nothing about the machine, but offered a pamphlet. In the second the man who knew about such things was out but would be back Monday. In the third, only an inferior type of washer was carried against which the housewife had been warned and the proprietor knew none of the talking points in comparison with other makes. In none of the establishments was an actual washing machine to be seen, although one dealer offered to take her to a wholesale establishment and have his make demonstrated if she would make an appointment for "some time next week." The literature which she took home with her was illuminating, but it contained such phrases as "place the clothes and the water in the tub" and answered none of her particular questions.

This is not intended as a mere destructive criticism but is a suggestion of what might have been

done by a salesman, preferably a saleswoman who not only understood the workings of her machine (which not one of these clerks did!) but something of the problems which arise in the use of the article in the home. It is a further suggestion to manufacturers that the practical eye of a housewife might add details of actual application which would serve as telling talking points in their advertising literature.

Stagger the Industries

Whether or not the extension of the daylight saving enactment is passed by Congress during the month, it is now quite evident that something more than setting the clock ahead is necessary to bring relief in traffic and power congestion in the industries.

The setting of the clock ahead one hour has unquestionably brought about a marked psychologic change in getting started about the daily tasks of the nation that is most desirable. A careful analysis of power loads in the West does not, however, reveal any great saving in power as was brought out by W. G. Vincent in a careful analysis of this problem which appeared in the columns of the Journal of Electricity.

One thing above all others needed to give better balance to the power load and at the same time to prevent traffic congestion is to stagger the hours of beginning the daily tasks for different business and industrial establishments. Even if but a half hour margin is made and appreciable good will result.

Undoubtedly the early winter hours, should the daylight saving enactment be extended, will witness many offices and private businesses opening a little later than the demands of the hour would ordinarily indicate and thus to a degree the staggering of the daily business will be accomplished. But the matter should not be left to mere hit or miss happening. It is of sufficient importance to merit the most careful consideration and action by those in authority.

A Defect in Commission Makeup

There is one defect that stands out prominently in modern regulating commission life that, if uncorrected, will unquestionably result in a permanent setback in public opinion which will in some respects lower the high regard in which regulation of public utilities is now held by all parties coming directly under control of the utility commissions throughout the various commonwealths of the nation.

This defect is a non-observance of proper balance in commission makeup by not having at least one engineer member when problems that are so vitally considered are in great measure of an engineering nature.

That the combined engineering societies of one commonwealth in the West representing over a thousand prominent engineers are urging the attention of the governor of that state to this defect is one emphatic example of the manner in which engineers —the one group of men best qualified to discuss technical problems in utility life—hold in mind the present regulatory situation.

It is seriously to be hoped that balance in commission make-up somewhat agreeable to the editorial in the Journal of Electricity for July 15, 1918, entitled "The Engineer and the Regulating Commission," will receive the ear of those in authority having in charge the appointing of regulatory commissions.

Adding the Last Straw

Warnings have gone out the country over not to let the good news of the battlefronts lessen the interest in the Liberty Loan. Indeed, the contrary should be the case. With the goal in sight, there is no incentive to give up the race; it rather calls for the greater spurt of energy to hasten the end. The German people have been lulled into quiet by persistent victories—their consciousness of right has never been tested by a despair which questions the worth of further sacrifice. Today with the Russian question reopened, Turkey virtually out of the fight and Austria in a turmoil, the necessity of preserving the Hohenzollern dynasty which up to now has been the "sacred righteousness" of their cause, is undoubtedly beginning to appear less apparent. Can we resist the temptation of adding the blow of an oversubscribed loan to the list of arguments?

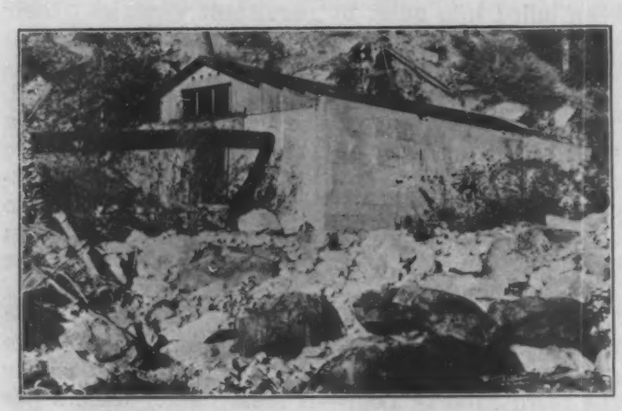
This is no small demand which is being made upon us. Six billion dollars calls for at least once and a half the subscription made by each of us for the third Liberty Loan—it means sixty dollars per capita over the entire United States—it means a much larger per capita for the Western district where there is a more uniform standard of prosperity. Those who have helped in collecting the loan realize the many cases of sickness and debt which make subscription impossible, the many workers who get from thirty to fifty dollars a month from which they must help others, the families of ten and even more who can afford but one bond between them. You who read this editorial are among the well-to-do classes in comparison with these—you are shamelessly prosperous. It is not your share of the loan you are called upon to fill—it is theirs as well. Of course, you have subscribed, but unquestionably you have not subscribed enough. This is your last chance —**Buy More Bonds!**

THE NEW JOURNAL SERVICE: Women in the electrical industry of the West and how their service is proving of invaluable aid in helping to meet the shortage in labor in the power industry will be one of the striking features that will be profusely illustrated in the next issue of the Journal of Electricity. "What of the Great Hetch-Hetchy Project?" will be the feature story in the issue of Nov. 15, 1918. Both of these issues will be bristling, too, with suggestions of helpfulness in forwarding the California Electrical Cooperative Campaign and in offering unusually timely suggestions to meet the present day needs of the industry.

THE WEST DURING THE LAST THIRTY-ONE

The electrical industry is not one of great antiquity. It was only in 1879 that the first central station in the world was built in California; in the same year the incandescent light was developed. The appearance of the retail electrical merchant is largely an affair of this century and the history of his development and organization has been written during the last decade. Very early in the story of this progress the Journal of Electricity took its place and the celebration of the thirty-first anniversary of its founding and the review of its history, is largely a review of the events and development of the West during that period.

The first central station of the world was started in June, 1879, by Geo. H. Roe for the California Electric Light Company. That is, San Francisco was the first electrically lighted city, New York not having a central station plant until 1882. This was before the invention of the incandescent lamp which occurred in October of that year, and business was confined to arc lighting. In 1891 a contract was



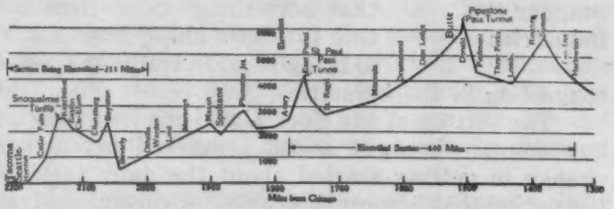
The source of power for the first long distance transmission line in the world—the old San Antonio plant built in 1891. 10,000 volts for 28 miles was the record.

made for the Edison rights in San Francisco, out of which grew the Edison Light & Power Company which was succeeded by the San Francisco Gas & Electric Company, later the present Pacific Gas & Electric Company.

The first hydro-electric plant in America was the one at Oregon City, now owned by the Portland Railway, Light & Power Company. This was installed by the Willamette Falls Electric Company in 1889, who used the water power of the falls and transmitted electric power to Portland for general distribution purposes. The transmission line carried 4000 volts over a distance of 13 miles.

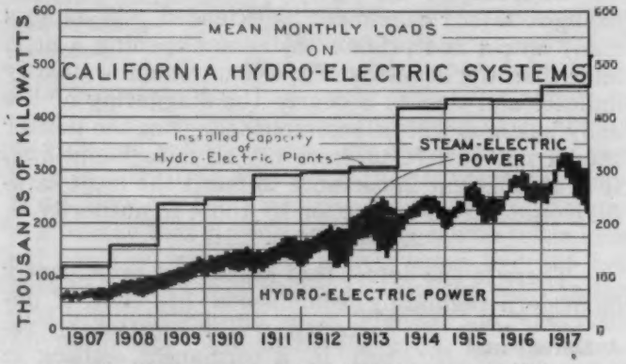
The first long distance transmission line in the terms of that day was that of the San Antonio Light and Power Company at Pomona, California, built in 1891, which transmitted 10,000 volts for 28 miles. This was the world's record of twenty-seven years ago for both high voltage and long distance and it was heralded the world over as a great achievement. Today the record for long distance in transmission is held by the Yuma-Wonder line of the Southern Sierras Power Company, which carries 100,000 volts for 830 miles. The Big Creek Line of the Southern California Edison Company transmits 150,000 volts for 275 miles, breaking the record for high voltage.

The most gigantic string of high tension power lines in the world—from Harlowton, Montana, on westward through Spokane, Seattle, Portland, San Francisco, Los Angeles and to San Diego on the



Profile of the Chicago, Milwaukee and Puget Sound Electrified Railway, the first transcontinental line to use electric power.

Mexican border in the south, with but five small gaps, a possible chain of interconnected power feeding an empire greater than France, Italy, England and Germany combined. Indeed, an empire so vast and a total length of transmission so long as to cover in one stretch of transmission lines a distance far greater than from Petrograd to Vladivostok—3000 miles. These power lines are shown in full detail upon a most comprehensive map furnished as a supplement with this issue of the Journal of Electricity.



THE GROWTH OF POWER LOADS IN CALIFORNIA

The first hydro plant was established in 1892 with a capacity of 480 kw. In 1893 another was added, two in 1895, three in '96 and so on up to 1907 when this diagram commences, when there were 54 plants with a capacity of 122,265 kw.

The world's largest systems of electric generation—The giant proportions to which electric generation has advanced may be strikingly gleaned from a comparative statement of the annual output of fifty of the largest hydroelectric companies on the American continent. Once again, due to the present joint operation of three vast hydroelectric companies in central California, the West is seen to have within its confines a system of electric generation that overtops any other system of hydroelectric or steam electric generation in the world. The companies of the West, which appear in the list below, are printed in heavy bold in the order in which they appear on this list:

YEARS — ACHIEVEMENTS AND POSSIBILITIES

Pacific Gas & Electric Company, Great Western Power Company, Sierra & San Francisco Power Company	**1,500,408,765**
Commonwealth Edison Company	1,488,080,000
Niagara Falls Power Company	1,188,221,770
Ontario Power Co. & United Electric Light & Power Co.	954,913,584
Montana Power Company	**947,732,014**
Montreal Light, Heat & Power Company	946,832,817
Hydraulic Power Company	871,563,138
Toronto Power Company	800,638,000
Southern California Edison Company	**794,687,405**

Fifty largest companies show that of the total 22 billions of kw-hr., 3.5 billions were generated in Canada, 4.85 billions in the West, and 18.5 in the remaining portion of the United States. Thus again it is seen that the West, with its 6,700,000 population, generates from 25 to 26 per cent of the power generated in the remaining systems of the United States.

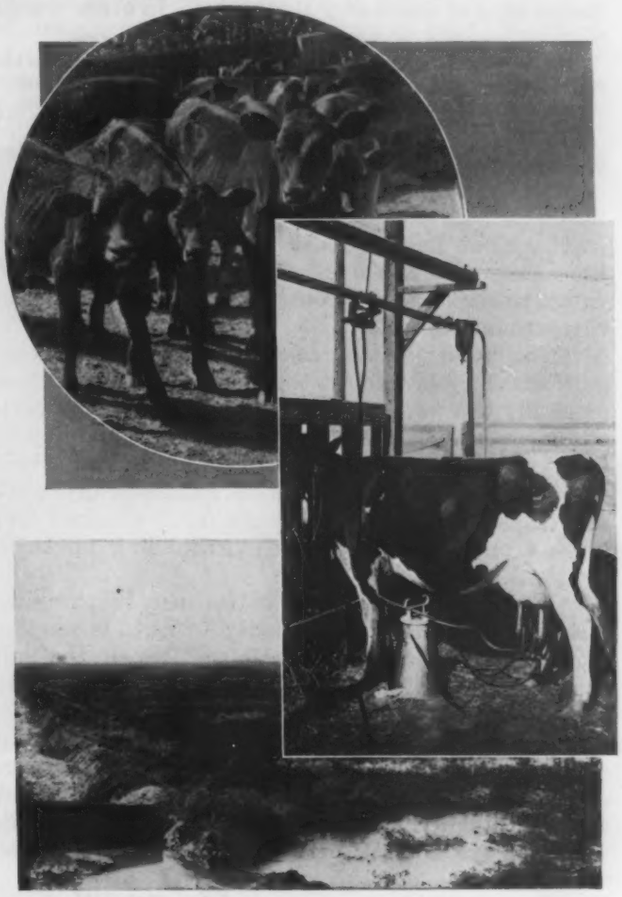
The world's first and only electrically operated transcontinental railroad — the Chicago, Milwaukee & Puget Sound—passing through Montana, Idaho and Washington. This superb success and triumph of the method electrical applied to transcontinental railroads is causing engineers and financiers the world over to contemplate most seriously the beginning of the gigantic task of electrification of many of the mountain passes of the West.

The most superb and complete electrically operated mine in the world—the Bunker Hill and Sullivan, near Kellogg, Idaho—the greatest lead silver mine in existence.

The record-breaking high voltage long distance transmission—the Big Creek transmission lines of the Southern California Edison Company from Big Creek to Los Angeles, 275 miles, at 150,000 volts. It receives its energy through single-phase transformers—the largest yet built. Energy is generated from two power plants, one dropping water 1900 ft. and the other 2100 ft. The present installed capacity is 6400 kw. with an ultimate possible expansion of 225,000 kw.

The greatest dams of the world—the Elephant Butte, the Roosevelt, the Shoshone, the Calaveras, the Morena, the Spaulding and the Arrow Rock—are all located in the West. Aside from the Assouan Dam in Egypt the Elephant Butte Project on the Rio Grande, with its 318 ft. dam stores 2,638,868 acre feet of water which is more than any other artificial reservoir in the world. The Roosevelt, in Arizona, with its artificial storage of 1,367,300 acre feet comes next on the list, while the highest dam in the world is the Arrow Rock on the Boise Project in Idaho—a huge rubble concrete structure towering 348.5 ft. in vertical height. The Calaveras, near San Francisco—250 ft. in height—is to be the tallest dirt filled dam in the world, while the Morena, near San Diego—267 ft. high from the bottom of its foundations—is the highest rock fill dam ever attempted in the history of engineering.

The greatest daring in municipal water-supply—the Los Angeles Aqueduct and the Hetch-Hetchy—cisco by tunnels and pipes from the Sierra through the Coast Range, a distance of 180 miles. Vast water powers developed en route are proving and grace the triumphs in engineering in the West. The former has already been completed and conducts water from the high Sierras through mountains and deserts a distance of 240 miles to the south, while the latter is to bring water from the Hetch-Hetchy Valley in the Yosemite National Park to San Fran- will prove of great engineering and financial value to these municipal projects.



ELECTRICITY IN WESTERN AGRICULTURE

More electricity is used on the farms of California alone than in all the rest of the United States together, the other states of the West ranking second.

The world's greatest gold dredge—electrically operated throughout—Yuba No. 16, near Hamonton, California—like a giant iron clad Nautilius—devours with its chain of 18 cubic foot buckets a grand total of 15,000 tons of gravel per day. It digs the gravel, extracts the gold and stacks the waste at a cost of only three cents per ton.

The longest high voltage submarine cable in the world—the high powered cable of the Great Western Power Company passing beneath the San Francisco Bay from Oakland to San Francisco, a distance of 3½ miles, and operating at 11,000 volts.

The second longest span of aerial cable is to be found at Carquinez Straits near Benicia, California. Four steel cables of the Pacific Gas & Electric Company's system cover in a single stretch a distance of 4427 feet.

The most powerful single discharge turbine in the world—the 18,000 h.p. installation of the Pacific Gas & Electric Company at the Wise Power Plant near Colfax, California.

The most powerful high head water turbine in the world—the new 24,000 h.p. installation of the Puget Sound Traction, Light & Power Company at the White River Plant, twenty miles south of Seattle.

Vast Potential Water Power of the West —

Thus it is seen that over seventy per cent of the undeveloped water power of the nation lies in the states west of the Rocky Mountains. In other words,

POTENTIAL WATER POWER OF UNITED STATES

	Minimum hp.	Maximum hp.
North Atlantic States	2,225,000	4,092,000
South Atlantic States	2,344,000	4,256,000
North Central States	1,733,000	3,558,000
South Central States	1,438,000	2,785,000
Western States	18,996,000	36,707,000
	26,736,000	51,398,000

in the eight Pacific Coast states lie undeveloped practically two and one-half times the undeveloped water power in all the remaining commonwealths of the nation combined.

The public service commissions of the West authorized by law to fix the rates and to supervise generally the work of the public utilities in the various commonwealths have established new and important records in utility achievement. Indeed, their rulings are models of their kind. In the Northwest as well as in California the eastern commissions find much from which to pattern in building up their decisions.

Electrical energy due to its use in pumping water for irrigation throughout the West is rendering an unique and indispensable service. In the San Joaquin Valley of California, for instance, are to be found the most extensive electrically operated pumps in the world, not only for water but for the pumping of fuel oil as well. California alone last year produced over a billion dollars in agricultural wealth and another billion in manufactured products. Electricity plays a vital part in this great national service.

The electrical contractor dealers of the West are recognized as the most progressive group in the United States—even in British Columbia to the north. Stated meetings are held at which problems vital to the interest of the industry are discussed and action taken looking to their solution. It was early recognized that the West had thus advanced so far beyond the East in the contractor-dealer movement and its spirit of co-operative helpfulness that W. L. Goodwin, a product of the Pacific Coast States, carried the ideals of western cooperative helpfulness to the centers of the East and established what is now known as The Goodwin Plan — which in recent months has been recognized by authorities the world over in establishing a new era in the merchandising of electrical ware.

The California Electrical Co-operative Campaign is a movement of cooperative helpfulness originating in California that comprises all four branches of the electrical industry—the manufacturer, the jobber, the central station, and the contractor-dealer—whereby new ideals in mutual service have been established. A fund of $12,000 has been voluntarily contributed from all branches of the industry to to carry on the work. Two paid field agents are now traveling up and down the great commonwealth of California, preaching the gospel of the Golden Rule and the principle of cooperation. These field agents act under the direction of an advisory committee composed of a notable group of men representing all branches of the industry who have in former years established records for coordinating the work in the industry.

The Universities of the West are recognized the world over as institutions unique in their production of men of an adventurous type that play the game of life with an avowed intention to be of service to mankind and the desire to institute new and daring enterprises in engineering endeavor, in statesmanship and in journalism. Herbert Hoover, Franklin K. Lane, Jack London and James Hopper are typical of our argonauts in the West. Here in our great electrical industry upon close inspection will be found fully two score such men devoted to ideals of service in engineering daring and helpfulness that may well challenge the world to match their caliber.

Shipbuilding is proceeding in Pacific Coast ports in progress without a parallel in the annals of the art. Not only is a vast proportion of the new 25,000,000 tonnage of the Emergency Fleet Corporation being constructed here, but the workmanship in efficiency and in speed is carrying away all honors offered by the corporation. The following figures supplied by the U. S. Shipping Board speak for themselves:

Ships Completed and Delivered up to Sept. 14, 1918

Pacific Coast section, 137 vessels of 1,011,160 d.w. tons.
Atlantic Coast section 87 vessels of 634,860 d.w. tons.
Great Lakes section 131 vessels of 399,855 d.w. tons.
Gulf Coast section 1 vessel of 3,500 d.w. tons.
Total, 356 vessels of 2,045,875 d.w. tons.

It will be noticed the Pacific Coast quota was practically fifty per cent and that the ships built on the Coast averaged nearly six hundred tons larger than on the Atlantic.

Ships Launched but not yet Completed and Delivered to September 14, 1918

Pacific Coast section, 134 vessels of 610,900 d.w. tons,
Atlantic Coast section 69 vessels of 392,816 d.w. tons.
Great Lakes section 33 vessels of 117,050 d.w. tons.
Gulf Coast section 28 vessels of 102,800 d.w. tons.
Total, 264 vessels of 1,223,566 d.w. tons.

Here again the Pacific Coast has furnished fifty per cent of the total ships launched in the entire country.

The bank clearings for the month of August of twenty-two cities of the West (Arizona, New Mexico and Colorado are not included in the list) indicate some of the vast spending power of this region:—

City	Aug., 1918	City	Aug., 1918
San Francisco	$488,652,47	Stockton	8,786,470
Seattle	164,528,363	Ogden	8,267,679
Los Angeles	129,247,000	Helena	7,484,119
Portland	109,707,379	Boise	6,000,000
Salt Lake City	52,358,981	San Jose	5,384,308
Spokane	32,724,455	Billings	4,877,742
Oakland	27,833,395	Long Beach	4,318,113
Tacoma	22,365,348	Pasadena	3,548,024
Sacramento	18,253,773	Yakima	3,451,621
Fresno	10,854,613	Bakersfield	3,177,418
San Diego	10,509,717	Reno	2,821,919

A total of $1,125,152,944. It is to be noted that this is not a month in which the transactions of the Liberty Loan modify the figures.

THIRTY-ONE YEARS OF SERVICE

(The history of the Journal of Electricity has been colorful with the enterprise of the West. The vast possibilities of this pioneer region from an electrical and engineering standpoint have led to the daring of new methods and large scale operation and it is not to be wondered at that so many world's records have been here established. It has been the privilege of the Journal of Electricity to share in the making and recording of the history of these splendid thirty-one years.—The Editor.)

The Journal of Electricity is one of the oldest electrical papers of the United States. Foreseeing the possibilities of this beginning industry in the West, the paper started in 1887 to help its growth and to meet its needs. From that time to this it has played a vital part in every development which has taken place in the West. Its columns form a record (in many cases the only one now available) of the successive world records and remarkable achievements of this region in the electrical field; its co-

QUOTED IN TWO HEMISPHERES

A few of the many quotations from the Journal of Electricity which have appeared in leading papers all over the world. Represented here are: The Literary Digest, The Scientific American, Millard's Review of Shanghai, China, Denkinotomo of Japan, The San Francisco Chronicle, The Friday Electrical Page, Portland, Oregon, The N. E. L. A. Bulletin, The Pacific Service Magazine, The Bulletin of the Pacific Power & Light Company, The Electrical News of Toronto, Canada, The Electrical Review of London, England, and the Electrical World. Australia, South Africa, and India should also be included in this list.

operation and its full support have been of material assistance in every movement in the way of progress. Through the personal work of those associated with it and through the influence of its columns, the Journal of Electricity has been a leader in formulating the policies of the industry and it can fairly claim a large measure of responsibility for the cooperative spirit and successful inter-organization of the industry in the West.

Societies and the Cooperative Movement —

The Journal of Electricity was instrumental in the formation of the Pacific Electrical Transmission Society in 1899 which played so important a part in affairs electrical on this coast up to 1903. Members of the staff were among those to propose and carry out the Electrical Development League and the Pacific Coast Section N. E. L. A. The Journal of

CORRESPONDENCE FROM THE WORLD OVER

From every corner of the globe come inquiries, letters of appreciation, requests for help. Russia, China, Japan, Siam, Canada, Ireland, South America, England and Italy are to be recognized from the stamps of this group.

Electricity has been a consistent advocate of the cooperative movement and its editorials for several years preceding fostered the spirit which led up to the formation of the Electrical Cooperative Campaign of California. It has watched and recorded the growth of the electrical retail trade in this region, has stood for its organization and development and with sympathy for the western standpoint, is today taking an important part in the solution of merchandising problems. It is now urging the unification of Engineering Societies in the West with the purpose of meeting vital sectional problems in a cooperative spirit.

Legislation —

In the formulating of legislation with a bearing on the electrical industry the Journal of Electricity has played an important part. Recognizing the development of our water resources as primarily a problem of the West, it has untiringly, and in the early days almost single-handedly, waged a campaign in behalf of liberal legislation in that matter; its

editorials have been read by and have influenced representatives and senators toward a recognition of the importance of governmental relief. The Journal of Electricity was one of the leaders in the movement which led to the formation of a Railroad Commission in California, the forerunner of western development in that line and in many respects the pattern for later eastern action. The Journal of Electricity has assisted in bringing about the financing of Pacific Coast utilities to a marked degree; its records have more than once been accepted in courts unquestioned in the determining of patent priorities.

Technical Advance —

In the columns of the Journal of Electricity have been recorded the achievements in technical practice and thought during the past thirty-one years, so many of which have been developed in the West. Through its pages have been presented for the first time new theories of valuation, of engineering thought and electrical practice which have since been adopted into general use or are the forerunners of future developments. The Journal of Electricity has fostered research work in the Universities and is in some measure responsible for the institution of courses to meet technical needs along the lines of both gas and electricity. It has stood for the broadening of the scientific and engineering curriculum in our universities. In the meeting of special western problems such as the use of fuel oil in power plants and the applications of electricity to western agriculture it has in large measure stood alone in its contribution to the industry.

National and International Relations —

Since its foundation the Journal of Electricity has had a national standing of dignity compatible with its age and its high standards, and has been of influence in bringing the western case and the western problems before the tribunal of eastern centers. Furthermore, the Journal of Electricity has been a pioneer in the urging of a larger and more wholesome outlook toward our Pan-Pacific neighbors. From the first it has found an interested audience in this field and today it has subscribers in Japan, China, Korea, Russia (the Russian government is still on its lists for five paid subscriptions), India, Australia, the Philippines, Hawaii and in practically every country of South America.

Personal Influence —

Today the Journal of Electricity stands for service to the West, the solution of its problems and the recording of its achievements. Not only does it bring information to meet the particular needs of this region but it is heart and soul in the development of the electrical industry west of the Rockies and has a part in the plans and policies which determine the course of its progress. In recognition of its standard of impartial service, the Journal of Electricity is increasingly being called upon to give advice and information on the worth of electrical ware, of electrical firms and individual recommendations for employment and government service.

War Service —

Since the United States has entered the great war, the sole object of the Journal of Electricity has been to serve its ends. Realizing that only in so far as it may help to win this war and to prepare for a sane reconstruction period ofter the war, can it justify its existence during this trying time, the entire work of the paper has been tested on this basis. Not only have the members of this organization attained 100 per cent in all war giving, not only have fifty per cent of its staff entered the government service and their positions where possible filled with young women workers in the spirit of the times, but every contribution to the columns of the Journal of Electricity has been weighed in the light of its value to the national interest. Its service in Liberty Loan and other patriotic campaigns has been recognized by special letters of thanks from government officials—and the contents of its pages even where not specifically labelled "war" are selected with the thought of contributing to the efficiency of an industry which is a war essential. Lost energy and wasteful methods are today a national loss—and to the elimination of such conditions, as well as to the furthering of direct war service, the influence of the Journal of Electricity is pledged.

THE JOURNAL STAFF

The thirty-one years that have been chronicled by the Journal of Electricity and its predecessors have been years of splendid achievement.

E. B. Strong, the veteran president of the Technical Publishing Company, publishers of the Journal of Electricity, is shown as "The Builder of the West" in this issue on page 373, in appreciation of his long and able service to the West. Mr. Strong is the only one of the Journal staff who can date back in service to the days of its founding in 1887.

W. M. Deming, general manager of the Journal of Electricity, is a native of New England and came to the Journal in August, 1917, after twenty-nine years of successful business experience with the General Electric Company, in which service he occupied many positions of importance and responsibility. Mr. Deming is a figure of national reputation in the electrical industry and his wide experience acquired first hand in many of the problems of the electrical industry—particularly in the jobbing and contractor-dealer field—is of invaluable assistance in the helpful work of the Journal of Electricity in building up the electrical industry in the West. As president and part owner of the Electric Supply Company of Memphis, Tenn., one of the best known electrical supply houses in the South, he not only keeps in constant touch with all problems affecting the industry, but is himself vitally interested in their correct solution.

Robert Sibley, the editor of the Journal of Electricity, is a native of the Southern States. He received his high school and college education in the West, graduating in 1903 as the most distinguished student among the engineering classes at the University of California and was the only graduate of the year to be elected to all three of the scholarship societies—Phi Beta Kappa, Sigma Xi, and Tau Beta Pi. He has served four years as head of the school of engineering at the University of Montana and four years as professor of mechanical engineering at the University of California. He came with the Journal

in 1912 and since January, 1917, has directed the editorial policy of the Journal. Mr. Sibley's writings on subjects relating to hydroelectric and steam electric practice in the West, and on engineering development in China, Japan and other points of the Orient, where he has traveled extensively, have been widely and favorably reviewed in the technical and scientific press of the world. Characteristic of this comment is the signed review of his recent book on "Elements of Fuel Oil and Steam Engineering," that has just appeared in the September issue of the Journal of the American Society of Mechanical Engineers, which tersely summarizes his recent book in the following highly favorable light: "It is unquestionably the best work of its kind for students of steam engineering who are interested in fuel oil."

W. M. Deming
General Manager

Robert Sibley
Editor

A. H. Halloran
Assistant Business Manager

Miss Clotilde Grunsky
Associate Editor

Arthur H. Halloran, assistant business manager of the Journal of Electricity, graduated from the University of California with the class of 1904. He has been a consistent worker in behalf of the Journal since 1907 when he entered the Journal's service. In addition to Mr. Halloran's present activity on the business end of the Journal he is also serving in a most effective manner as secretary of the Pacific Coast Section, N. E. L. A., with which organization he has been intimately associated since its founding in 1916. Prior to coming with the Journal of Electricity, Mr. Halloran served on the editorial and managerial staff of the Mining and Scientific Press. In 1915 he was appointed a member of the Jury of Awards at the Panama-Pacific International Exposition.

Miss Clotilde Grunsky, associate editor of the Journal of Electricity and daughter of C. E. Grunsky, the noted civil engineer, graduated with the class of 1914 from the University of California, receiving election to Phi Beta Kappa and the award from the University faculty as the most distinguished graduate among a class of eight hundred men and women students. Since graduating she has devoted much study and time to vocational and welfare work among women and was for a time connected with the faculty of Mills College as special lecturer on vocational problems. Her constructive technical writing on subjects relating to engineering and contractor-dealer problems in the electrical industry of the West are familiar to the readers of the Journal of Electricity.

Miss Viola Lockhart, of the Journal staff, is a graduate of the University of California with the class of 1918 in which she gained distinguished honors in literary effort under Professor Charles Mills Gayley, the noted dean of the faculties at the state university, who chose Miss Lockhart as departmental reader in appreciation of her excellent talent in English expression. Miss Lockhart, though but a recent graduate, is now giving a course on business English in the Extension Division of the University of California.

Miss Agnes Ehrenberg comes to the Journal staff with a secretarial certificate from Columbia University where she attended a year in graduate study after receiving her degree at the University of California. She has had several years experience as a teacher at Miss Ransome's School in Oakland, California and has had experience as office secretary in the offices of the assistant general manager of the U. S. Rubber Company and the employment supervisor of the Western Union Telegraph Company in New York City.

Guy T. Bowman, for ten years foreman in charge of the composition room of the Journal of Electricity, has added a wealth of expression in the advertising and editorial makeup of the Journal, due to a wide and extended experience in the printer's art. And the many others who are serving in various capacities of editorial and managerial work for the Journal of Electricity in the home office at San Francisco, in the cities of the Northwest and in the East, which space forbids their mention, are all of the same high character. Such service has indeed made possible the splendid accomplishments of the Journal's thirty-one years in the West.

WHO WRITE THE ARTICLES FOR THE JOURNAL OF ELECTRICITY

The Journal of Electricity enjoys perhaps a unique position in technical journalism. Speaking as it does for an industry in the West that has established a host of new world records in commercial, engineering and industrial achievement, it numbers among its contributors many of the most distinguished engineers, executives, educators and public-spirited thinkers of modern times. The following partial outline will give some conception of the breadth of discussion and of the distinguished writers that have contributed to its columns during the past eighteen months, among which will be found the leaders of practically every progressive movement in the industry in the West during this period.

Among these contributors are:

Present Day Problems of Interest to the Industry

JOHN A. BRITTON, vice-president and general manager of the Pacific Gas & Electric Company, regent of the University of California, on public policy and water power legislation.
JOHN CLAUSEN, vice-president and manager of the foreign department of the Crocker National Bank, on foreign finance in commerce and engineering.
HARRY COE, vice-president and manager of the foreign department of the Anglo London Paris National Bank, on finance in the Orient.
RAY INGERSLEV, electrical engineer of the Siam Electricity Company, Ltd., on electrical problems in Siam.
R. A. LUNDQUIST, expert for the department of commerce, on electricity in the Orient.
H. F. JACKSON, president of the Pacific Coast Section N. E. L. A. and vice-president and general manager of the Sierra & San Francisco Power Company, on rates and priorities.
A. G. WISHON, general manager of the San Joaquin Light & Power Corporation, on rate raising.
A. H. BABCOCK, consulting engineer for the Southern Pacific Company, on railway electrification.
E. J. WALLIS, western manager of the Western Electric Company, on conserving labor in the jobbing business.
W. K. WHITE and H. G. PROST, well known patent attorneys, on electrical patents in the West.
MAJOR GEORGE F. SEVER, U. S. A., on problems of the War Industries Board.
MAX THELEN, president of the California Railroad Commission, on utility war problems.
GERTRUDE TUCKER, secretary to the president of the Southern California Edison Company, on women and the war.
ALBERT E. SCHWABACHER, federal fuel administrator for California, on fuel conservation.
H. G. BUTLER, power director of the California Railroad Commission, on power conservation.
D. M. FOLSOM, federal fuel oil administrator for the Pacific Coast, on fuel oil and its conservation.
CLOTILDE GRUNSKY, associate editor of the Journal of Electricity, on women in the industry and good practice in merchandising in the West.

Power Generation and Development

W. F. NEIMAN, chief engineer of the Universal Gas & Electric Company, on data concerning California power plant generation.
C. E. GRUNSKY, consulting engineer, on rate fixing problems and new power development.
A. E. CHANDLER, president California Water Commission, on new advances in Western water law.
JOHN H. LEWIS, state engineer of Oregon, on organization of water right administration.
F. H. FOWLER, chief hydroelectric engineer for the U. S. Forest Service, on new water power developments.
W. L. HUBER, consulting civil engineer, government reserves and forestry data.
L. R. JORGENSEN, consulting engineer, on multiple arch design.
F. G. BAUM, consulting engineer, on new hydroelectric development.
P. M. DOWNING, chief engineer electric department, Pacific Gas & Electric Company, on new hydroelectric development.
ARNOLD PFAU, chief hydraulic engineer Allis-Chalmers Company, on large hydro units.
J. E. WOODBRIDGE, chief engineer Sierra & San Francisco Power Company and chairman engineering committee of Pacific Coast Section, N. E. L. A., on increasing economy in hydro generation.
J. P. JOLLYMAN, head of electric construction Pacific Gas & Electric Company, on increasing hydro economies.
JOS. N. LE CONTE, head of hydraulic department University, of California, on snow fall data in predicting stream flow.

Transmission and Distribution

C. O. POOLE, chief engineer Southern Sierras Power Company, on transmission line construction.
L. M. KLAUBER, superintendent San Diego Consolidated Gas & Electric Company, on substation design and construction.
JOHN R. BROWNELL, superintendent of safety, California Accident Commission, and ROBERT L. ELTRINGHAM, electrical engineer for the Commission, on safety problems.
E. B. ROSA, chief physicist, W. C. WAGNER, field electrical engineer, and C. E. OAKS, research engineer of the U. S. Bureau of Standards, on problems connected with the National Electrical Safety Code and with high tension insulator investigations.
H. A. BARRE, electrical engineer for the Southern California Edison Company and chairman of the engineering committee of Pacific Coast Section, N. E. L. A., on high voltage problems and new power development.
D. I. CONE, electrical engineer with joint committee on inductive interference, on problems encountered in interference research.
J. A. KOONTZ, electrical engineer Great Western Power Company, on high tension phenomena and economy study.
R. C. POWELL, electrical engineer Pacific Gas & Electric Company, on iron as a conductor of electricity.
R. E. CUNNINGHAM, electrical engineer of the Southern California Edison Company, on distribution losses.
L. S. READY, electrical engineer for California Railroad Commission, on war problems.
H. H. SCHOOLFIELD, chief engineer Pacific Power & Light Company, on national electrical safety code.
S. J. LISBERGER, chief engineer San Francisco district, Pacific Gas & Electric Company, on distribution economies.
E. R. NORTHMORE, superintendent of distribution, Los Angeles Gas & Electric Corporation, on electrolytic and distribution losses.
J. B. FISKEN, chief engineer Washington Water Power Company, on electric range loads.
R. J. DAVIDSON of the Pacific Power & Light Company, on underground distribution.
AUSTIN ADAMS, San Diego Consolidated Gas & Electric Company, on electric installation at Camp Kearny.
MAJOR JOHN C. HAYES, formerly president and general manager of the Mt. Whitney Light & Power Company, on electrical installation at Camp Lewis.

Steam Generation and Fuel Oil Practice

R. J. C. WOOD, superintendent of steam generation, Southern California Edison Company, on steam power plant losses.
ROBERT SIBLEY, Editor Journal of Electricity, on fuel oil and steam engineering practice.
CHAS. H. DELANY, steam power plant specialist Pacific Gas & Electric Company, on fuel oil and steam engineering practice.
E. A. ROGERS, efficiency engineer for the Palace Hotel, San Francisco, on increasing isolated power plant economies.
J. M. WADSWORTH, administrating engineer of fuel administration, on increasing power plant economy.
C. N. CROSS, assistant professor mechanical engineering at Stanford University, on increasing boiler room economies.
W. J. SANTMYER, mechanical engineer for the Puget Sound Traction, Light & Power Company, on powdered coal.

Cooperative Electrical Selling

L. H. NEWBERT, chairman California Electrical Cooperative Campaign;
W. L. GOODWIN, founder of the "Goodwin Plan," General Electric Company.
M. L. SCOBEY, general manager of the Home Electrical, on dealer problems.
G. E. ARBOGAST, president Southern California Association of Electrical Contractors and Dealers, on affiliation.
H. P. PITTS, commercial department Pacific Gas & Electric Company, on commercial practice.
R. M. ALVORD, manager supply department General Electric Company, on better selling methods.
W. D. KOHLWEY, general manager Kohlwey-Smith-Alfs Company, on the Goodwin Plan.
A. L. SPRING, field representative California Electrical Cooperative Campaign, on cooperative selling.
FORESTER E. SMITH, secretary Seattle Association Electrical Contractors and Dealers Association, on the Goodwin Plan.
T. E. BIBBINS, president and general manager Pacific States Electric Company, on community of interest.
D. E. HARRIS, salesmanager Pacific States Electric Company, on better selling.
W. M. DEMING, general manager Journal of Electricity, on contractor-dealer problems.
A. H. ELLIOT, secretary Pacific Division National Electric Supply Jobbers' Association, on credit building.
M. A. DE LEW, executive committee California Association Electrical Contractors and Dealers, on the Goodwin Plan.
D. J. BUTTS, Los Angeles manager Western Electric Company, on cooperation.
H. H. COURTWRIGHT, general manager Valley Electric Supply Co., on vacuum cleaner cooperative campaigns.
C. E. WIGGIN, Dunham, Carrigan & Hayden, on the electrical dealer.
GOLDEN J. GUIVER, formerly secretary Utah Association Electrical Contractors and Dealers, on dealer problems.
I. W. ALEXANDER, commercial engineer San Joaquin Light & Power Corporation, on commercial practice.
C. F. BUTTE, general manager Butte Engineering Company, on contractor-dealer problems.
W. R. PUTNAM, salesmanager of the Utah Power & Light Company, on accounting and selling practice.
H. A. LEMMON, salesmanager of the Truckee River General Electric Company, on local advertising.
F. D. WEBER, electrical engineer Oregon Insurance Rating Bureau, on new rules for installation.
MARY F. PATTERSON, head of Household Art Department, University of California, on window decoration.
W. R. HERSTEIN, general manager Electric Supply Company, on credit problems.
ELMA STEINMANN, in charge of salesmanship at The Emporium, on better selling methods.
A. D. McMULLEN, electrical dealer at Salt Lake City, on trade acceptances.
GEORGE A. SCHNEIDER, Buffalo manager Western Electric Company, on technical contractor-dealer problems.
L. C. MULLGARDT, architect at P.-P. I. E., on the electrical contractor and the architect.
H. N. SESSIONS, commercial engineer Southern California Edison Company, on electrical refrigeration and salvage.
A. H. HALLORAN, assistant business manager Journal of Electricity, on contractor-dealer problems.

THE OPINION OF THE LEADERS OF THE WEST

During recent months a number of splendid letters have been received by the Journal of Electricity from the leaders of all lines of electrical interest in the West, whose tribute of appreciation is the strongest testimony to the actual service of the Journal of Electricity in every vital movement of the day.

JOHN A. BRITTON, vice-president and general manager of the Pacific Gas & Electric Company and the noted dean of the electrical industry in the West: "Your journal has been largely instrumental in awakening the interest of the public in the efforts of the corporation to give service. I view your journal, from an advertising as well as from a reading standpoint, equal to any publication of its kind in the United States."

GUY W. TALBOT, president of the Northwest Electric Light & Power Association and of the Pacific Power & Light Company, and a recognized builder in the Northwest: "The Journal of Electricity has a worthy mission in the public utility industry and it is filling it most commendably. Your journal deserves to succeed and to receive the hearty cooperation of the industry in the service it is rendering."

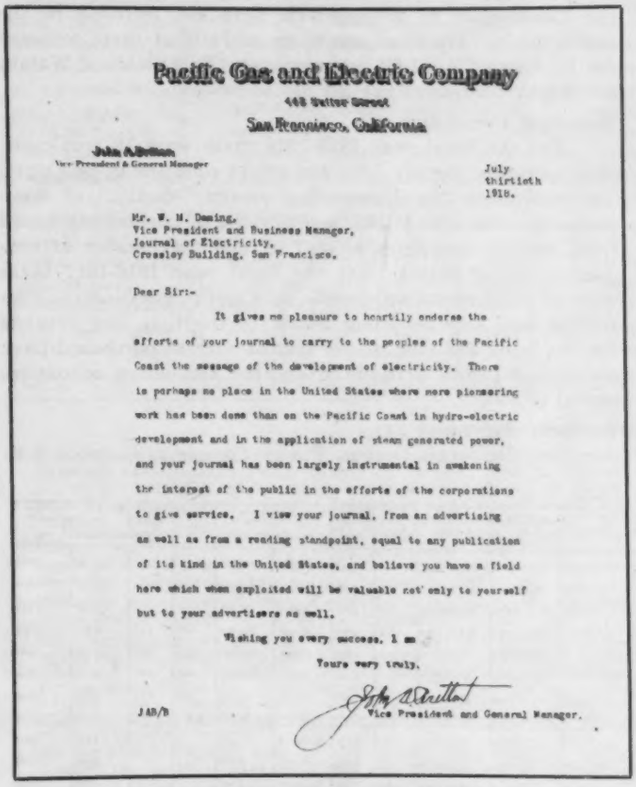
GEORGE A. CAMPBELL, general manager of The Truckee River General Electric Company, the largest and most influential public utility company in Nevada: "You will continue to grow because you are expending your greatest effort in advancing the industry, instead of utilizing all your energy in advancing the Journal."

A. E. CHANDLER, president of the California Water Commission and one of the most eminent authorities on Western Water Law: "I personally know of no periodical which is rendering better service in the publication of facts, figures and arguments designed to correct existing erroneous views

and to BUILD UP THE INDUSTRY than the Journal of Electricity."

A. G. WISHON, general manager of the San Joaquin Light & Power Corporation, a corporation that serves the greatest electrically irrigated area in the world: "My men place the Journal of Electricity first in the matter of technical and general information in our line. . There is no medium of advertising that could possibly reach the electrical trade on this coast with the same influence, and therefore, it ought to be a prime source for advertising."

H. L. BLEEKER, vice-president of the Northwest Electric Light & Power Association and vice-president and general manager of The Washington Water Power Company, a company that serves the electrical lines of the Chicago, Milwaukee & Puget Sound Railway and the superbly electrically equipped mines of the famous Coeur d'Alenes of Idaho: "I would say that it is more closely read than any other publication of its class that we receive, and we look for its receipt with keen pleasure."



Pacific Gas and Electric Company

448 Sutter Street

San Francisco, California

John A. Britton
Vice-President & General Manager

July thirtieth 1918.

Mr. W. H. Deming,
Vice President and Business Manager,
Journal of Electricity,
Crossley Building, San Francisco.

Dear Sir:-

It gives me pleasure to heartily endorse the efforts of your journal to carry to the peoples of the Pacific Coast the message of the development of electricity. There is perhaps no place in the United States where more pioneering work has been done than on the Pacific Coast in hydro-electric development and in the application of steam generated power, and your journal has been largely instrumental in awakening the interest of the public in the efforts of the corporations to give service. I view your journal, from an advertising as well as from a reading standpoint, equal to any publication of its kind in the United States, and believe you have a field here which when exploited will be valuable not only to yourself but to your advertisers as well.

Wishing you every success, I am

Yours very truly,

JAB/B

Vice President and General Manager.

A LETTER OF APPRECIATION

An expression of appreciation from John A. Britton, vice-president and general manager of the Pacific Gas & Electric Company, which is typical of the many letters from which the quotations were taken which appear on this page.

R. H. BALLARD, vice-president of the National Electric Light Association and vice-president of the Southern California Edison Company, one of the largest and in many respects one of the most unique and efficient utility organizations in existence: "Its files are a down-to-the-minute history of electrical achievement in the great territory which it covers so conscientiously. We must accord to the Journal, devoted to its needs, one of the highest places in current electrical literature."

A. E. SCHWABACHER, Federal Fuel Administrator, in writing appreciatively to the Editor of the Journal: "With thanks to you and the men of your Journal for the excellent support you are giving the Fuel Administration in its efforts for conservation."

A. B. WEST, vice-president and general manager of The Southern Sierras Power Company, operating the longest transmission high tension system in the world: "We find that the technical articles contained in the Journal of Electricity are of great value in keeping our operating heads in touch with the activities of other power companies."

S. M. KENNEDY, general agent of the Southern California Edison Company and one of the best known authorities on commercial matters pertaining to the electrical industry: "In fostering the splendid electrical cooperative movement in California, the Journal of Electricity has done a magnificent and enduring work."

H. C. REID, president of the California Association of Electrical Contractors and Dealers—an association of national reputation for effective results: "The electrical contractors and dealers have felt the need of just such assistance as you are rendering and, in these days of evolution of the contractor-dealer movement, your columns are providing a medium of exchange that is indeed very helpful."

RONALD C. GRIFFIN, electrical distribution department of the Pacific Gas & Electric Company, writes to the editor of the Journal of Electricity how the younger men view its columns: "The Journal of Electricity is so full of matter of intimate interest to western engineers that it compels me to decide that I can no longer continue to be a non-subscriber."

ED WRIGHT, secretary of the Public Service Commission of Oregon, a commission noted for many advances in utility regulation: "We have found your publication to be of interest and value to the commission, and shall be glad to be placed upon your paid subscription list."

T. E. BIBBINS, president and general manager of the Pacific States Electric Company and one of the best known figures in the electrical supply business in the West: "We have been keenly interested in your efforts to bring to the electrical reading public the problems of wholesale and retail distribution. This form of encouragement is very helpful to the electrical distributors. It is because of this and other reasons that our company has used your columns for a substantial part of its advertising program."

W. S. BERRY, western salesmanager of the Western Electric Company and president of the Pacific Division of the Electrical Supply Jobbers' Association, an association noted for esprit de corps of its membership and keen attention to gathering facts of interest to the trade: "I always look forward to the latest issue of the Journal of Electricity with the greatest interest and pleasure as to the popular and instructive reading matter covering technical subjects, current events and happenings on the Pacific Coast."

PACIFIC COAST SECTION, N. E. L. A. (Riverside Convention), an association representing over a half-billion dollars in invested capital: "We wish to place on record as the first resolution, one coming from the convention as a whole and expressing the sentiments of each individual member, a resolution acknowledging our full appreciation of the work done, and the unselfish cooperation of the Journal of Electricity and its staff. To the Journal and its organization this convention is indeed indebted:

"**Whereas,** The Journal of Electricity has freely published in its columns all of the papers and reports presented at the Riverside Convention of the Pacific Coast Section, N. E. L. A., and has also published a Daily Service Issue during the convention,

"**Be It Resolved,** That this association hereby expresses its hearty thanks to the Journal and places on record its appreciation alike of the generosity and efficiency with which this service has been rendered."

PACIFIC COAST SECTION, N. E. L. A. (Del Monte Convention). In writing to Robert Sibley, Editor of the Journal of Electricity, who acted as general chairman of the Convention Committee, the Executive Committee of the Association, thus expressed itself:

"The Executive Committee of the Pacific Coast Section, N. E. L. A., at its meeting of Sept. 20, 1918, unanimously decided that a vote of thanks and appreciation be extended to the Journal of Electricity organization for the able, efficient and economical manner in which the convention details were handled."

Proceedings of Spokane Convention of Northwestern Electric Light and Power Association —

MR. CLARK (Puget Sound Traction, Light & Power Company): "I think it is perfectly fitting that this Association take some action in the way of expressing appreciation and gratitude to the publication known as the Journal of Electricity for the very excellent cooperation and interest that they have manifested in the proceedings of this Association which has made possible the chronicling of the events of this body in such a way that it is bound to add prestige and give impetus to the work of the Association; and particularly to the cause of the development of the electric range. I move that an expression of appreciation be extended by this Association on behalf of the Journal of Electricity." Motion duly seconded, put to a vote and unanimously carried.

STATISTICAL DATA ON POWER COMPANIES

BY W. F. NEIMAN

(An interesting compilation of comparative data of power companies required by the Railroad Commission of California. Financial data is to be obtained from that source, but the tables here given deal with the statistical data which has never been thus classified—and form valuable reference material. The author, who spent many months on this tabulation, is sales manager of the Universal Electric and Gas Company, with head quarters in San Francisco. —The Editor.)

Classification of Companies —

The "Uniform Classification of Accounts" for electric corporations defines a class "A" company as one having operating revenue exceeding $100,000.00, a class "B" company as one having an average annual operating revenue less than $100,000.00 and more than $25,000.00, and a class "C" company as one having an average annual operating revenue of less than $25,000.00.

For the year 1916, there were 61 incorporated electric companies reporting to the Commission, 25 class "A" companies, 11 class "B" companies and 25 class "C" companies.

The 25 companies listed, together represent 98.2% of the total operating revenue "electric" of the 61 incorporated companies for the year 1916.

Operating Revenues —

Operating revenue is divided into two parts, the first that which is derived from the sale of current, and the second that which is derived from other operations directly connected with the sale of current.

For convenience and distinction the former will be called "operating revenue electric" and the latter "other operating revenue," the sum of the two being "total operating revenue."

In addition to the 61 incorporated companies there were 19 non-incorporated companies (all Class "C") reporting to the Commission in 1916, which were not included in the above totals. The total operating revenue of these concerns for 1916 was $74,881.02, one company (East Oakland Water) and Light Company) not giving its revenue.

Municipal Companies —

For the fiscal year 1915-1916 there were 18 municipalities operating electric light and power concerns in this state. The equivalent "total operating revenue electric" of these companies was $812,172.33, and the cost of current purchased from outside companies $90,847.18, and the number of consumers served 29,980. For the fiscal year 1916-1917 there were 19 cities operating electric light and power concerns (the city of Los Angeles being added to the list), the revenue derived being $831,602.30, the cost of current purchased from outside companies $116,146.36 and the number of consumers served 33,996.

Territory Served —

The California-Oregon Power Company operated both

Year Ending December 31, 1915

Electric Companies	Gross Electric Revenue Amount 1915	% of 1914	Sales to Other Electric Companies for Re-sale	KWH. Generated Hydro	Steam	Other Motive Power	Total	KWH. Purchased	Total Generated and Purchased	KWH. Sold	Loss in % of Total Generation	Av. Rate Received per KWH Sold in cents	System Peak in KW.	Connected Load in KW.	Diversity Factor	Annual Load Factor in %	Number of Consumers	Average Annual Revenue per Consumer
(IV) Pacific Gas and Electric Co.	$ 9,922,173.52	113.3	$ 346,057.17	379,650,258	160,916,919	.....	541,567,176	139,193,573	726,760,749	479,070,581	34.1	2.068	No Record	392,059	----	----	164,199	$ 59.74
(V) Southern California Edison Co.	9,960,837.37	101.6	76,720.26	205,923,797	77,582,511	.....	283,506,260	2,987,669	255,999,929	211,981,395	24.1	2.109	54,625	209,999	2.62	52.9	116,763	38.19
(VI) Pacific Light and Power Corp.	2,983,918.30	110.2	23,720.52	316,077,999	6,023,675	.....	316,078,189	163,197	316,260,336	251,282,992	20.5	1.157	No Record.	128,391	.....	----	38,727	88.96
(VII) Great Western Power Co.	2,327,992.24	117.8	1,076,535.39	318,266,000	4,000,000	.....	322,266,000	46,981	322,311,981	252,262,129	21.7	.729	58,100	108,969	1.99	63.9	19,936	152.03
(VIII) San Joaquin Light and Power Corp.	1,577,869.26	108.6	113,205.06	164,026,900	199,000	.....	164,225,900	.....	164,225,900	123,815,900	25.3	1.976	19,800	50,999	2.57	61.2	20,926	76.01
(IX) Los Angeles Gas and Electric Corp.	1,560,081.05	109.3	120.76	.....	36,381,712	.....	36,381,712	No Record.	36,381,712	29,054,323	20.1	4.201	13,099	56,938	4.35	31.9	41,777	29.61
(X) Sierra & San Francisco Power Co.	1,223,986.39	113.3	106,073.35	130,997,960	29,900,580	.....	155,897,960	32,093,650	170,197,809	149,961,673	13.5	.945	39,030	61,923	1.93	58.5	9,077	300.16
(XI) City Electric Co.	1,307,201.57	119.9	16,020.33	.....	21,703,000	.....	21,703,000	5,520,986	76,919,986	65,794,912	14.3	1.935	26,730	66,139	2.19	98.9	5,317	227.37
(XII) Western Gas & Electric Company. — Stockton District				23,902,320	587,100	.....	23,989,420	18,327,927	92,316,397	39,713,856	18.0	1.837	No Record.	83,688	.....	----	9,533	66.57
Richmond District				.....	.....	.....	.....	9,213,290	9,213,290	9,179,079	0.9	2.946	No Record.	9,947	.....	----	3,419	37.79
Eureka District				3,979,700	1,607,300	.....	5,587,500	.....	5,587,500	4,663,209	8.1	2.950	No Record	5,943	.....	----	1,592	98.64
Total Western States	944,351.07	105.1	.....	26,877,020	2,194,400	.....	29,071,520	27,541,217	51,611,537	93,574,539	15.6	2.166	.....	.....	.....	----	17,373	59.30
(XIII) San Diego Con. Gas & Electric Co.	912,181.25	103.1	3,152.29	.....	27,119,671	.....	27,119,671	.....	27,119,671	20,078,781 Record Incomplete.	26.0	4.594	7,500	29,237	2.56	41.3	19,028	47.99
(XIV) Mt. Whitney Power & Electric Co.	795,191.02	112.6	.....	48,829,900	3,930,700	.....	52,760,600	2,160,800	52,860,600	Incomplete.	----	----	No Record.	18,999	----	----	7,189	102.89
(XV) Northern California Power Co. Con.	949,613.09	101.7	212,668.88	137,686,997	.....	.....	137,686,997	.....	137,686,997	113,674,856	17.5	.625	22,700	36,308	1.62	69.9	4,757	199.27
(XVI) The Southern Sierras Power Co.	571,772.74	125.7	236,808.96	29,610,600 Gross only for Fiscal Year 1914-15	1,321,075	.....	30,931,675 Gross only for Fiscal Year 1914-15	32,888,193	54,751,718 Gross only for Fiscal Year 1914-15	43,555,733	20.0	1.299	9,100	12,837	1.41	91.2	3,069	190.39
(XVII) California Oregon Power Co.	352,339.37	104.6	3,988.24	.....	.....	.....	.....	.....	.....	No Record.	----	----	No Record.	Incomplete	----	----	Incomplete	.....
(XVIII) Coast Counties Gas & Electric Co. (3)	249,773.60	98.8	.....	7,092,100	108,700	.....	9,151,100	3 5,071,990	3 12,223,590	3 5,810,695	52.5	4.717	No Record	Incomplete	.....	----	4,089	98.34
Halfin Power Co.	223,260.20	132.0	5,687.96	2,165,790	1,330	11,995	2,117,015	5,790,669	7,855,679	4,391,189	24.7	3.936	2,350	6,739	3.02	90.9	2,629	89.71
(XIX) Ore Water, Light and Power Co.	396,249.97	102.6	.....	10,226,200	.....	.....	10,226,200	6,513,800	16,739,700	10,193,367	15.3	2.943	No Record.	7,761	----	----	2,913	91.98
Ore Electric Corporation.	199,391.09	95.9	11,578.83															
(XX) Santa Barbara Gas & Electric Co.	202,333.33	111.2	.....	9,970,318	.....	.....	9,970,318	.....	9,970,318	3,955,602	22.7	5.855	1,795	4,825	2.30	29.9	5,276	38.35
(XXI) Midland Counties Public Service Corp.	165,142.76	101.9	.....	.....	.....	.....	.....	5,328,682	5,328,682	3,709,699	19.3	3.579	1,263	5,909	4.93	30.9	3,643	97.90
(XXII) Coast Valleys Gas & Electric Co.	157,911.25	99.3	.....	134,990	.....	.....	134,990	7,911,800	7,698,790	5,989,581 Record Incomplete	22.3	2.913	2,325	6,379	2.79	37.1	3,935	96.15
(XXIII) Ventura County Power Co.	191,628.28	102.6	.....	1,360,900	.....	.....	1,360,900	3,022,909	4,383,809	Incomplete	----	----	No Record.	Incomplete	----	----	3,912	91.51
(XXIV) Snow Mountain Water & Power Co.	139,928.37	102.9	134,928.37	27,555,600	.....	.....	27,555,600	137,662	27,993,262	No Record.	----	----	No Record.	No Record.	----	----	No Record.	.....
(XXV) Universal Electric Gas Co.	121,159.95	107.3	.....	.....	9 9,235,190	.....	9 9,235,190	279,819	9 5,119,159 Record Incomplete	9 3,235,196 No Record.	8.5	2.586	2,150	3,770	1.85	9 28.2	579	209.85
(XXVI) Ontario Power Co.	100,216.59	97.4	7,256.80	No Record. Meter Defective	.....	.....	No Record. Meter Defective	819,980	819,980 Incomplete	No Record.	----	----	No Record.	No Record.	----	----	2,432	92.99
(XXVII) Coachella Valley Ice & Electric Co.	98,129.32	99.7	99,109.94	.....	.....	.....	.....	7,079,985	7,079,985	4,329,612	10.5	1.550	2,230	3,299	2.88	31.9	199	493.55
Total 25 Electric Companies	$ 31,326,096.35	108.6	2,632,705.19	Incomplete.	339,317,139	11,995	Incomplete.	Incomplete	Incomplete	Incomplete	----	.....	----	Incomplete	----	----	Incomplete	Incomplete

DATA FOR THE YEAR ENDING DECEMBER, 1915

1 The Sierra and San Francisco Power Co. reports having purchased 32,093,650 kw-hr. from the City Electric Co. in 1915. The City Electric Co. reports selling 32,093,650 kw-hr. under Railway Power (to United R.R. Co.) for the sum of $353,030.15 in 1915. The Sierra Co. does not include this cost under "Cost of current Purchased," and apparently includes no income for same under "Electric Revenue." Deducting this 32,093,650 kw-hr. (which undoubtedly is paid for directly by the United R.R. Co.) we have "Loss" as 16.3% and "Average Rate" as 0.925 cents per kw-hr., which are probably the correct figures.

2 The Western States Gas & Electric Co. (Richmond District) shows a "Loss" of 0.4% which is absurdly small. Either kw-hr. purchased or kw-hr. sold is incorrect.

3 The Coast Counties Gas & Electric Co. and the Union Traction Co. of Santa Cruz are owned by the same people. The Coast Counties generates some current and purchases the balance from the Pacific Gas & Electric Co. In 1915 the Coast Counties turned over to the Traction Co. 1,169,700 kw-hr. which was not included in the 5,210,045 kw-hr. reported sold. The amount disposed of was, therefore, 6,379,745 kw-hr. which makes the correct "Loss" 30.8% and not 43.5% as given above. The Coast Counties reports no revenue under "Electric Revenue" derived from current turned over to the Traction Co., credit being given for cost of same under "Operating Expense."

4 The Universal Electric & Gas Co. reports net generated. During 1915 there was 784,096 kw-hr. used at power house. Including this the "Loss" was 18.1% instead of 5.5% which was "Line Loss" only. Adding used at power house to total generated and purchased, Annual Load Feeder is 31.3%.

9 Exclusive of Municipal Street Arc Lights—Current for Street Arcs is purchased on flat rate per Arc, no meter record of kw-hr. consumed. Revenue from Street Arcs in 1915 was $316,211.50.

Year Ending December 31, 1916.

Electric Companies	Gross Electric Revenue: Amount 1916	Gross Electric Revenue: % of 1915	Sales to Other Electric Companies for Re-Sale	KWH. Generated: Hydro	KWH. Generated: Steam	KWH. Generated: Other Motive Power	KWH. Generated: Total	KWH. Purchased	Total Generated and Purchased	KWH. Sold	Loss in % of Total Generated	No. Kwh. Received per Kwh. Sold, in cents	System Peak in KW.	Connected Load, in KW.	Diversity Factor	Annual Load Factor, in %	Number of Consumers	Average Annual Revenue per Consumer
Pacific Gas and Electric Co. (N)	$ 14,097,765.14	101.8	$ 501,721.17	923,925,688	163,130,988	------	536,556,176	181,298,731	748,309,907	581,553,129	22.1	1.936	141,008	447,110	2.17	62.2	178,630	$ 56.53
Southern California Edison Co.	9,703,329.23	102.9	80,307.12	217,576,152	45,999,892	----	263,065,044	35,289,766	298,898,813	220,399,029	26.3	2.139	60,930	220,922	8.72	56.0	129,019	79.92
Pacific Light and Power Co. (N)	3,237,627.60	116.3	3,531,128.25	272,399,352	5,809,513	2,490	278,361,571	19,950	277,595,591	218,112,687	21.0	1.086	52,765	134,163	1.62	52.1	24,097	37.67
Great Western Power Co. (N)	23,585,500.90	102.7	1,195,609.23	375,327,000	13,556,000	----	389,183,000	93,503	389,276,503	297,903,666	23.5	.760	69,300	117,767	1.67	63.7	15,757	177.19
Los Angeles Gas & Electric Corp. (S)	1,665,577.15	106.1	77.50	-------	90,169,737	----	90,169,737	No Record.	90,169,737	31,605,197	21.5	4.297	13,620	59,764	4.29	33.7	47,778	37.32
San Joaquin Light & Power Corp. (N)	1,552,961.39	98.7	13,397.96	109,081,666	1,367,221	----	110,948,887	-------	110,948,887	80,602,729	27.3	1.927	20,300	57,268	2.77	60.9	23,231	66.85
City Electric Company. (N)	1,909,553.35	116.2	9,858.94	-------	17,196,000	----	17,196,000	69,975,678	87,171,678	76,323,205	13.5	1.899	21,570	38,258	2.70	46.7	7,697	183.65
Sierra & San Francisco Power Co. (N)	13,640,930.38	111.1	138,296.17	123,579,970	9,189,700	----	142,769,670	39,356,731	182,126,401	168,339,511	14.9	.806	49,400	55,699	1.25	50.6	4,445	306.16
Western States Gas & Electric Company. (N) — Stockton District			-------	29,339,980	577,900	----	29,917,880	15,659,239	45,577,119	39,530,119	20.7	1.997	No Record.	26,179	----	-----	10,187	63.50
Richmond District			-------	-------	-------	----	-------	9,825,000	9,825,000	9,825,000	none?	2.954	No Record.	2,137	----	-----	3,579	34.27
Eureka District			-------	3,395,365	2,183,200	----	5,578,565	-------	5,578,565	5,029,960	6.9	3.693	No Record.	2,157	----	-----	4,669	98.18
Total Western States	993,282	104.8	-------	30,570,270	2,760,200	----	33,396,990	25,172,239	53,225,674	44,125,573	17.6	2.249	------	41,773	----	-----	18,435	52.86
San Diego Con. Gas & Electric Co. (S)	911,216.12	99.9	3,532.18	----------	29,282,023	----	29,282,023	-------	29,282,023	21,612,304	26.2	4.217	3,100	29,125	9.35	41.9	1,935	467.98
Northern California Power Co. Con. (N)	743,788.16	109.5	213,990.63	152,688,531	----------	----	152,688,531	58,200	152,946,731	123,277,029 Record Incomplete	18.7	.621	No Record.	37,506	----	-----	7,179	107.16
Mt. Whitney Power & Electric Co. (S)	760,855.09	108.1	-------	97,883,500	7,969,300	----	54,992,800	971,200	57,917,000	----------	----	----	13,020	20,234	6.69	55.0	1,350	102.95
The Southern Sierras Power Co. (N)	584,232.92	108.5	172,966.15	57,976,000	785,750	------	58,381,750	243,300	57,906,850	43,825,509	24.3	1.330	No Record.	21,697	----	----	3,378	172.98
California Oregon Power Co. (N)	385,333.36	102.2	12,671.21	9,196,355	------	----	9,196,355	-------	9,196,355	7,343,216	20.1	1.337	No Record.	14,394	----	----	3,478 Record Incomplete	84.83
Coast Counties Gas & Electric Co. (S)	260,511.28	100.0	-------	3,161,600	2,673,900	------	5,347,000	6,072,677	9,919,677	6,712,126	32.9	3.331	No Record.	No Record.	----	----	4,091	27.57
Holton Power Co.	257,937.28	116.9	2,827.96	1,132,293	75.50	93,400	1,183,793	3,829,070	5,012,863	3,993,715	34.0	6.433	No Record.	2,116	----	----	2,172	84.79
Santa Barbara Gas & Electric Co. (S)	227,457.99	113.9	-------	-------	5,006,009	------	5,006,009	-------	5,006,009	3,994,810	24.8	5.281	1,250	7,775	3.99	43.6	5,899	37.89
Oro Water, Light and Power Co. (N)	35,937.66	102.8	-------	3,931,000	-------	----	3,931,000	6,530,000	15,461,000	13,967,221	14.7	4.998	No Record.	9,015	----	----	2,278	87.91
Oro Electric Corporation (N)	194,895.60	99.8	13,079.22															
Midland Counties Public Service Corp. (N)	199,713.19	119.9	-------	-------	-------	----	-------	7,911,396	7,911,396	6,669,812	10.0	2.997	1,898	7,189	4.61	54.7	4,040	42.98
Coast Valleys Gas & Electric Co. (N)	174,697.98	108.1	-------	-------	287,295	----	287,295	3,049,800	3,337,095	2,605,774	28.0	2.931	2,275	4,366	2.67	32.0	3,716	92.28
Universal Electric Gas Co. (S)	171,067.78	196.2	-------	-------	9,665,999	----	9,665,999	3,272,024	7,937,523	6,823,997	13.2	2.493	2,750	6,580	2.37	38.9	1,442	118.63
Coachella Valley Ice & Electric Co. (S)	149,919.33	147.2	119,189.15	-------	-------	----	-------	7,245,000	7,245,000	6,981,175 Record Incomplete	29.0	1.930	3,225	7,216	2.69	29.9	221	663.98
Ventura County Power Co. (N)	141,251.61	99.7	-------	-------	43,000	----	43,000	5,118,790	5,161,790	----------	----	----	No Record.	5,197	----	----	3,768	37.49
Snow Mountain Water & Power Co. (N)	121,927.26	99.8	149,957.26	25,313,300	-------	----	25,313,300	179,286	25,492,586	No Record.	----	----	5,300	No Record.	----	54.7	No Record.	------
Ontario Power Co. (S)	107,337.68	107.1	6,557.20	6,180,862	-------	----	6,180,862	425,600	6,605,886	4,980,251	24.6	2.155	No Record.	No Record.	----	----	No Record.	------
Total 25 Electric Companies	$ 33,291,385.75	104.4	$ 2,241,997.93	2,083,619,935	392,942,082	52,390	2,476,614,347	398,015,886	2,874,630,233	Incomplete	----	----	-------	Incomplete	----	----	Incomplete	Incomplete

DATA FOR POWER COMPANIES FOR THE YEAR ENDING 1916

1 The Sierra and San Francisco Power Co. reports having purchased 32,156,600 kw-hr. from the City Electric Co. in 1916. The City Electric Co. reports selling 32,156,600 kw-hr. under Railroad Power (to United R.R. Co. of S. F.) for the sum of $353,734.50 in 1916. The Sierra Co. does not include this cost under "Cost of Current Purchased," and apparently includes no income for same under "Electric Revenue." Deducting this 32,156,600 kw-hr. (which is probably paid for direct by the U. R. R. Co.) "Loss" would be 17.1% and "Average Rate" 0.996 cts. per kw-hr.—these most likely are the correct figures.

2 Evidently some error in Report—see Table for year 1917, Western States Gas & Electric Co., Richmond District.

3 Main station only.—In the latter part of 1916 the San Diego Cons. Gas & Electric Co. acquired the Escondido Utilities Co. and the Oceanside Electric & Gas Co. (Revenue in 1915 for the former was $9,607.70 and for the latter $7,103.15). These properties are the ones omitted in the columns noted. The total Electric Revenue includes that of Oceanside, hence the annual revenue per consumer is slightly larger than it should be for Main Stations only.

4 Of the 6,712,126 kw-hr. reported sold by the Coast Counties Gas & Electric Co. in 1916, 1,144,400 kw-hr. was turned over to the Union Traction Co., no revenue for which is included under "Electric Revenue" in their report. Deducting amount turned over to Traction Co. the Average Rate Received is 4.679 cts. per kw-hr. sold.

5 Kw-hr. reported sold by the Holton Power Co. for 1916 is probably less than the actual amount sold. The difference seems to have been included with kw-hr. sold in 1917. Taking total kw-hr. generated and purchased for 1916 and 1917 (21,131,340) and total sold for 1916 and 1917 (16,053,315) the "Loss" would be 24.0% and the average rate received for these two years 3.709 cts. per kw-hr. sold, which more nearly corresponds with 1915 results.

6 The Universal Electric & Gas Co. reports net generated. During 1916 there was 745,703 kw-hr. used at power house. Including this the "Loss" was 20.7% and the annual load factor 36.0%.

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* Exclusive of Municipal Street Arc Lights.—Current for Street Arcs is purchased by Los Angeles Gas & Electric Corp. from Pacific Light & Power Co. at flat rate per arc.—No meter record of kw-hr. consumption is kept by the L. A. G. & E. Corp. Revenue received from Street Arcs by L. A. G. & E. Corp. for year was $313,332.91, leaving $1,342,-244.24 as revenue exclusive of Municipal Street Arcs.

in California and in Oregon. In 1916 the revenue derived from the 5251 consumers in Oregon was $227,198.32 which included the total revenue from sales to other electric corporations by this company. Deducting this amount, the "total operating revenue electric" for the state of California for the year 1916, covering all companies reporting either to the Railroad Commission or to the State Controller, was $34,580,429.69, the Municipal companies representing 2.4% of the total.

It would probably be interesting to include in this article the territory served by each company in the table, but space will not permit; however, they have been divided into those serving in Northern California and those serving in Southern California, taking the Tehachapi Pass as the dividing line. The companies warked (N) serve the northern and those marked (S) the southern portion of the state.

Explanation of Table —

The Western States Gas & Electric Company serves in three distinct parts of Northern California, separated from each other by more than fifty miles. As they are not interconnected the data from each of the districts is given in the table. The statistical data of the Oro Electric Corporation and the Oro Water, Light & Power Company (the latter a class "B" company) are all included in the report of the Oro Electric Corporation.

On June 1, 1917, the Southern California Edison Company took over the Pacific Light & Power Corporation. In the 1917 table the latter is shown for five months and the total for the two companies, considered as one, for the entire year.

On April 1, 1917, the Pacific Gas & Electric Company took over the Oro Electric Corporation and the Oro Water, Light and Power Company. These latter companies made no report for 1917, but the results from the time of purchase are included with that of the Pacific Gas & Electric Company for 1917. These purchases reduced the number of class "A" companies in 1917 to 23.

Of the companies shown in the 1917 table the Southern California Edison Company owns or controls the Mount Whitney Power & Electric Company, the Santa Barbara Gas & Electric Company and the Ventura Water Power Company. The Great Western Power Company owns the City Electric Company. The San Joaquin Light & Power Corporation, owns the Midland Counties Public Service Corporation. The Sierra & San Francisco Power Company owns the Coast Valleys Gas & Electric. The Western States Gas & Electric Company and the San Diego Consolidated Gas & Electric Company are owned by H. M. Byllesby & Company. The Southern Sierra Power Company owns or controls the Holton Power Company and the Coachella Valley Ice & Electric Company. There are other companies (class "B" and class

"C") which are owned by these companies but which are not listed in the tables.

Figures of Growth —

In the tables under the column headed Gross Electric Revenue is given the "operating revenue electric" which, as explained, is the total operating revenue less "other operating revenue." The per cent this revenue bears to the corresponding revenue of the previous year, is also given in the column for the purpose of showing the rate of growth. To properly appreciate and make comparison between the companies in this respect it is necessary to note the companies absorbed by those listed during the three years covered by the tables.

The Pacific Gas & Electric Company acquired the West Sacramento Electric Company in 1915. The increase of 13.3% in revenue of the Pacific Gas & Electric Company in 1915 over 1914 is largely due to the revenue from the Panama Pacific International Exposition, in that year.

In the latter part of 1915 the Great Western Power Company took over and operated the United Light & Power Company and the Central Oakland Light & Power Company and the City Electric Company took over and operated the Consumers, Southside and Equitable Light & Power Companies. The Sierra & San Francisco Power Company acquired the La Grange division of the Yosemite Power Company Oct. 1, 1917. The San Diego Consolidated Gas & Electric Company acquired two companies—see foot note No. 3 in table for Year 1916. The Mount Whitney Power & Electric Company acquired the Tulare Country Power Company, August 1, 1915.

Growing Companies —

Since the number of consumers is given as those on the lines at the end of the year, it is evident that with a growing company the average revenue per consumer is less than would result if conditions remained stationary, the faster the company is growing the greater the difference. Similarly, the annual load factor for the system of a growing company is less than would result if all the consumers were on the system the entire year, as the system peak generally (though not always) occurs in the month of December.

Value of Reports —

The financial part of the reports is carefully checked by the Auditing Department of the Commission and the statistical part to some extent—undoubtedly this part of the report would be more thoroughly checked if the Commission had sufficient funds for this purpose. The statistical part of the larger companies' reports is very good and complete and two of them deserve special mention in this respect, namely, the Pacific Gas & Electric Company and the Great Western Power Company. A few of the reports are rather indefinite and some (mainly class "C" companies) are worthless. If all the companies would give as much care to the statistical part as they do to the financial part the reports would be of great value.

Year ending December 31, 1917.

Electric Companies.	Gross Electric Revenue. Amount 1917.	% of 1916	Sales to Other Electric Companies for Re-Sale	KW.H.-Generated. Hydro.	Steam	Water Motor Power	Total	K.W.H. Purchased.	Total Generated and Purchased.	KW.H.-Sold. Amount 1917	% of 1916	Loss in % of Total Gen.+Pur.	No. Kwh. Received per KWH Sold (in cents)	System Peak in K.W.	Connected Load in K.W.	Diversity Factor	Annual Load Factor (in %)	Number of Consumers	Average Annual Revenue per Consumer
Pacific Gas and Electric Co. (a)	$ 18875802.07	108.5	338013634	1758128.417	1268838.378	-----	673800667	130.878.371	2154677.038	1782.4	11.26	34.3	1.979	153,238	415,099	2.60	64.6	194379	$ 55.96
Southern California Edison Co. (b)	6,007,670.78	109.7	7252065.55	397803,000	138,107,000	-----	535,910,000	6,073,000	541,983,000	1976.6	11.7	1.379	150,630	415,057	1.76	74.1	32,981	72.99
Pacific Light & Power Co (Formerly) (b)	1307387.13	----	17230.55	1998.94.000	531,000	5,000	199,530,000	---- ----	199,530,000	116,036,000	----	38.2	1.127	----	----	----	----	----	----
Total - S.E.Co. and P.L.Co.	7315,058.16	98.1	7732067.77	596,697,000	138,638,000	5,000	681,332,000	6,073,000	687,355,000	551,540,000	106.9	19.8	1.326	150,630	415,057	1.76	58.1	32,981	89.95
Great Western Power Co. (c)	3,130,578.02	109.5	1,223,935	432,857,000	5,311,000	-----	438,177,000	232,000	438,409,000	348,201,000	110.2	20.6	2.69	78,700	134,775	1.35	69.7	19,316	178.54
San Joaquin Light & Power Corp. (c)	1,758,646.71	113.2	1089,01.09	183,823,200	19,744,300	-----	203,567,500	--------	203,567,500	170,373,327	136.3	23.0	1.516	25,100	62,312	2.50	66.1	24,103	66.61
Los Angeles Gas & Electric Corp. (d)	1,628,219.93	92.3	--------	--------	92,152,000	----	92,152,000	No Record.	* 92,152,000	* 23,853,000	* 105.2	* 21.1	* 4.190	* 13,810	* 67,103	* 1.34	* 36.2	* 19,767	* 39.89
Sierra & San Francisco Power Co. (e)	1,367,856.01	109.7	174,809.94	149,169,510	13,163,300	----	162,069,910	2 270,007,178	3 176,067,178	4 149,219,928	92.5	15.1	5 .898	46,370	57,005	1.45	49.9	6,176	236.90
City Electric Company. (f)	1,273,140.66	99.2	9631.66	--------	13823,000	----	13823,000	74,248,000	91,071,000	78,527,000	109.4	13.8	1.762	21,640	54,117	2.50	49.5	7,681	161.70
Western States Gas & Electric Company. (g) — Stockton District			--------	23,223,200	934,100	-----	23,223,200	21,622,027	44,845,227	No Record.	----	4 ----	4 ----	3,326	27,183	2.47	63.6	11,344	61.38
Western States Gas & Electric Company. (g) — Richmond District			--------	--------	--------	----	--------	6,576,200	6,576,200	5,223,142	129.5	11.3	2.961	2,016	7,008	2.99	72.3	1,071	37.91
Western States Gas & Electric Company. (g) — Eureka District			--------	9,097,000	3,233,000	-----	6,330,000	591,000	7,251,000	4,895,000	96.5	32.5	2.956	1,230	7,777	4.89	52.9	4,208	90.11
Total Western States.	1,097,516.32	110.6	--------	31,769,200	2,669,100	-----	34,438,300	28,789,227	63,227,527	Incomplete	----	----	----	----	95,477	----	----	26,960	53.38
San Diego Con. Gas & Electric Co. (h)	913,561.02	100.1	3,210.25	--------	23,715,000	11,000	23,726,000	1,276,000	25,002,000	21,999,000	92.9	13.7	9.896	2,925	9,996	4.71	38.9	11,310	91.39
Northern California Power Co. Con. (i)	1281,028.04	114.7	210,937.60	144,033,273	--------	----	144,033,273	--------	144,033,273	101,275,338	108.5	17.6	.669	24,300	60,393	4.63	70.3	7,960	113.76
The Southern Sierras Power Co. (j)	913,331.36	107.6	262,286.88	71,907,700	7,335,000	300	79,243,000	3,300,510	82,543,510	3 73,099,360	?	?	?	18,300	29,900	1.69	51.2	3,897	212.72
Mt. Whitney Power & Electric Co. (k)	811,574.31	106.7	--------	28,243,000	5,382,000	-----	33,625,000	17,857,000	51,482,000	No Record.	----	----	----	14,660	25,013	1.58	52.9	2,391	96.89
California Oregon Power Co. (l)	993,798.37	108.8	111,230	97,555,439	--------	----	97,555,439	--------	97,555,439	31,997,000	110.5	33.3	1.393	7,245	13,953	2.13	66.0	3,444	58.89
Holton Power Company. (m)	336,736.95	182.5	123,602.8	989,765	10,028	98,211	1,031,735	11,321,700	12,353,435	10,180,000	----	17.7	5 2.319	No Record.	3,704	----	----	3,773	97.63
Coast Counties Gas & Electric Co. (n)	2823,337.60	108.8	2,937.30	3,023,000	171,000	----	3,204,400	7,681,578	10,885,978	6,421,700	98.3	33.8	6 1.694	No Record.	Incomplete	----	----	6,327	94.18
South Barbara Gas & Electric Co. (o)	2496,702.29	112.3	----------	----------	5,706,574	----	5,706,574	181,400	6,008,174	5,116,000	100.7	20.3	2.565	2,100	9,317	4.96	32.7	5,708	98.80
Midland Counties Public Service Corp. (p)	2439,629.20	132.0	----------	----------	----------	----	----------	11,170,000	11,170,000	10,010,010	126.1	10	2.235	No Record.	7,918	----	----	9,345	60.93
Coachella Valley Ice & Electric Co. (q)	259,994.50	176.2	194,556.36	----------	----------	----	----------	14,257,000	14,257,000	12,760,177	200.0	11.2	1.701	2,735	9,949	1.91	98.2	367	323.30
Universal Electric & Gas Co. (r)	230,979.61	124.8	----------	7 3,992,907	----------	----	7 3,992,907	7 3,398,605	7 11,280,012	9,991,337	199.2	7 15.0	2.332	3,600	9,810	2.73	7 37.0	2,152	107.16
Coast Valleys Gas & Electric Co. (s)	213,827.64	120.6	----------	----------	334,700	----	334,700	10,587,900	10,922,600	7,697,379	180.0	31.3	2.829	No Record.	3,004	----	----	3,913	57.03
Ventura County Power Co. (t)	166,552.64	117.7	----------	----------	15,000	----	15,000	4,661,000	4,676,000	9,139,000	----	37.1	9.017	No Record.	3,727	----	----	3,730	92.20
Ontario Power Company (u)	142,978.70	119.7	3,745.12	5,514,700	----------	----	5,514,700	1,978,900	7,493,600	5,179,747	102.7	24.3	2.993	4,200	No Record.	----	63.6	2,736	98.31
Sierra Mountain Water & Power Co. (v)	146,856.31	98.7	126,856.31	29,958,300	----------	----	29,958,300	367,900	29,326,200	24,516,191	----	15.5	.482	5,870	No Record.	----	51.2	4	25,092.80
Total 23 Companies	$ 39,774,656.10	109.8	$ 3,113,201.06	3,130,344,031	983,512,712	45,648	4,113,902,391	91,940,325	4,232,842,716	Incomplete	----	----	----	----	Incomplete	----	----	9 994,800	$ 72.26

DATA FOR POWER COMPANIES FOR THE YEAR ENDING 1917

1 The Sierra & San Francisco Power Co. reports having purchased 27,425,990 kw-hr. from the City Electric Co. in 1917. The City Electric Co. reports selling 27,451,000 kw-hr. under Railway Power (to United R.R. Co. of S. F.) for the sum of $309,032.21 in 1917. The Sierra Co. does not include this cost under "Cost of Current Purchased," and apparently includes no income for same under "Electric Revenue." Deducting this 27,425,990 kw-hr. (which is probably paid for direct by the U. R.R. Co.) "Loss" would be 18.7% and "Average Rate" 1.070 cts. per kw-hr. These most likely are the correct figures. (Note.—Contract between City Electric Co. and U. R.R. Co. expired and was terminated in November, 1917.)

2 Kw-hr. Sold not given in 1917 Report—see 1916 Table for "Loss" and "Average Rate" of Stockton District of Western States Gas & Electric Co. for year 1916.

3 Main Station Only—all the rest of data for entire system. Main Station is entire system exclusive of Oceanside, Escondido and Capistrano, electric revenue from which amounted to $25,737.42 in 1917, leaving $886,823.66 from Main Station, that is considering "all other operating revenue" as derived from Main Station. In addition to Electric Revenue given for San Diego Cons. Gas & Electric Co. "all other operating revenue" for this company in 1917 was $14,107.35. The figures given for "Loss" and "Average Rate" are slightly higher than they actually are on account of kw-hr. sold outside of Main Station not being included.

4 The Kw-hr. reported sold in 1917 by the Southern Sierras Power Co. is probably incomplete. Their "Electric Revenue" has increased 30.6% over 1916 revenue yet they report selling 4,443,449 kw-hr. less than in 1916. If the kw-hr. generated and purchased and the kw-hr. sold were correct they would have a "Loss" of 53.6%, which is absurd—see "Loss" for this company in 1916 Table.

5 See foot note for Holton Power Co. in 1916 table.

6 The Coast Counties Gas & Electric Co. report selling 6,293,900 kw-hr. in 1917. In addition to this they turned over to the Union Traction Co. 1,140,600 kw-hr., no revenue for which is included in "Electric Revenue." This, added to the amount reported sold gives a total of 7,434,500 kw-hr. Using this figure the "Loss" is 27.7% which is correct, and actual % of 1916 kw-hr. sold is 110.8% and not 93.8%. In 1916 Report kw-hr. to Traction Co. was included.

7 The Universal Electric & Gas Co. reports net generated. During 1917 there was 709,478 kw-hr. used at power house. Including this the "Loss" was 19.8% and the annual load factor 39.3%.

* Exclusive of Municipal Street Arc Lights.—Current for Street Arcs is purchased by Los Angeles Gas & Electric Corp. at flat rate per arc light.—No record of kw-hr. consumption is kept. Revenue received from Street Arcs in 1917 was $251,282.27, leaving $1,376,932.16 as revenue exclusive of Municipal Street Arcs.

FINANCING THE CONTRACTOR-DEALER

BY W. R. HERSTEIN

(What you can do about it to obtain credit if you have a small capital or none—Suggestions as to avenues open and the basis on which money is to be borrowed. The author is well known as an authority on credit matters, being general manager of the Electric Supply Company of Memphis, Tenn.—The Editor.)

The financial feature of his business is always one of importance to the contractor-dealer. To many, it is vital. It is a matter of regret, therefore, that a failure to comprehend the most elementary principles of financing a business handicaps so many men who, otherwise, would become successful business men.

The Position of the Electrical Business

The contractor-dealer can hardly be considered according to the standards of the average business. Ordinarily a commercial enterprise is started after due deliberation, and with all the necessary preliminaries in the shape of capital, credit, management, etc. Probably more than half the existing electrical contracting businesses, on the contrary, like Topsy, "just growed" and never had any real, formal inception. Many contractor-dealers evolved into their present status without realizing that they were in process of evolution. The result is that they have not now, and have never had, any well defined financial policy; have never been in condition to command the lines of credit due them from the trade and from their bankers, and without which their operations are handicapped and the healthy and legitimate growth of their establishments restricted.

Just as every man is presumed to be innocent until he is proven guilty, so every person is assumed to be honest and worthy of credit until he proves himself otherwise—with this important distinction: that one man may be a safe credit risk for ten thousand dollars and another for only ten dollars.

The Basis of Credit

As even the veriest beginner in the business of granting credits knows, and at the risk of repeating what the reader has learned many years ago, three main points are to be considered in connection with every person applying for credit accommodation: capital, ability and character. However, since new candidates are entering the electrical field every day, it may be well to include these ideas in the present article, and to elaborate by going into the reasons for establishing these three tests.

The Importance of Adequate Capital

Capital is considered of first importance, because the other two items of ability and character are intangible, whereas capital is definite and certain, and when the credit man or banker knows the extent of this, his experience enables him to judge just how far he can with safety carry his customers. It may be assumed, also, that a person with sufficient capital could hardly have acquired or commanded it without a sufficiency of the other two requisites. At all events, the possession of capital insures creditors against disaster for at least a sufficiently long period after the new enterprise is started, to guard against unreasonably heavy loss, and thereby, to a large extent, supplies the lack of ability, and in some degree forms a safeguard against character of the wrong sort.

Credit Without Capital

It not infrequently happens that a person of known ability is without capital. Among business men, lack of capital is not considered a fatal bar to the granting of credit, and it may be remarked parenthetically that here is the big opportunity for the electrical supply jobber. If the applicant for credit, in addition to his known ability, bears a good reputation, almost any jobber would be justified, for the sake of creating a profitable outlet, in rendering financial assistance; provided, of course, that he is not at the same time fostering a new competitor for existing contractor-dealers in a field where such competition would manifestly result in disaster to both old and new; and provided also that the financial assistance rendered is kept within the bounds of prudence. With proven ability and good reputation, experience shows that the credit risk is a safe one when properly watched and confined within reasonable limits.

The Element of Character

Strange to say, the element of character is last to be considered in the judgment of the credit man, though at first thought it would seem that it should take precedence over the considerations of capital and ability. The reason for this is, that a man with capital and ability is likely to be successful; and self-interest, regardless of his character, will impel him to take care of his obligations properly. It is true, of course, that men like these must be constantly and closely watched, not for fear that the principal debt may be imperiled, but because any profit that might be earned from the account may be lost through unjust claims and other sharp practices. Nevertheless from purely a credit standpoint, the risk is fairly safe.

Open Dealing

If the contractor-dealer will keep the credit requirements of capital, ability and character in mind, he will attain that desirable condition where he sees himself as others see him—particularly as the credit man and banker see him; and he should thereupon be able to turn the situation to his own profit. First of all, he should not ask credit of people who do not know him—either personally, or through the medium of mercantile agencies and other regular channels of information. If he is seeking credit favors, he should lay all his cards on the table and give the other fellow a square deal. Any attempt at concealment will sooner or later become apparent, will create distrust and will operate to his disadvantage. If he knows he is not worthy of credit, he will gain little or nothing by seeking it. If he knows that he is worthy of credit, he should have no fear in giving a complete statement of his financial condition to every one interested, including, first of all, the mercantile agencies. If he is in doubt as to whether he is entitled to credit or not, the open and above-board policy is the only sensible one to pursue.

THE MOST IMPORTANT THING IN YOUR BUSINESS

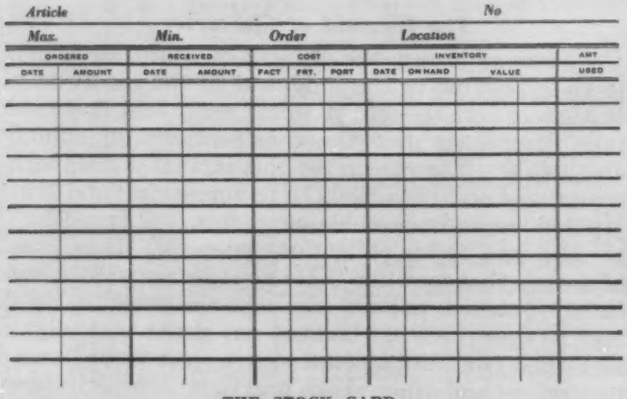
BY C. P. SCOTT

(The measure of your success, the factor which determines both the percentage which your overhead is to bear to your business and the compounding of your profits is here discussed in a practical and illuminating way by a man prominent in contractor-dealer affairs in Portland, Oregon. The paper is one presented at the recent convention of Oregon Contractors & Dealers.—The Editor.)

The Importance of Turnover

We are all more or less familiar with turnover, and we all know in a general way that a high rate of turnover is desirable. As to just how desirable this is, many of us are in the darkness. I have recently come to a realization in my own business, that the difference between a quick turnover and a slow turnover is much the same as the difference between success and failure. It is impossible to go into the subject of turnover very thoroughly without considering every factor entering into the business, because anything which will increase sales will also increase the rate of turnover.

I shall define turnover as the length of time your money is invested in any given lot of merchandise. It is the time that elapses from the moment


Article No
Max. Min. Order Location
ORDERED RECEIVED COST INVENTORY AMT
DATE AMOUNT DATE AMOUNT FACT FRT. PORT DATE ON HAND VALUE USED

THE STOCK CARD

The card index system applied to the perpetual inventory—by fixing a maximum and minimum stock and entering sales at stated periods, it is possible to keep in intimate touch with the condition of the stock.

you pay for an article until that article is again turned over into money or its equivalent. From this definition I want to call your attention to two things. The time of starting to figure turnover is when the goods are paid for, and the turnover is not complete until the money is collected. If you haven't ample capital in your business, you should limit your stock, where possible, to such merchandise as will give you a quick turnover, and do not forget that the turnover is not complete until you have collected the money. Slow collections mean a slow turnover.

How to Figure It

The common way of figuring turnover is to divide the amount of gross sales or business done by the average value of the stock on hand. To get the true rate of turnover the stock should be valued at the selling price, or the sales figured at the cost price. It is probably more often figured by dividing the gross business by the actual stock on hand at cost. While this method does not give the true rate of turnover, it has the advantage of being easy to obtain, and for purposes of comparison is probably close enough.

From the small amount of information I have been able to collect, I am strongly of the opinion that electrical jobbers have a better rate of turnover than the average dealer. When you stop to consider that the jobbers are buying their merchandise in the East, and must buy in larger quantities than the dealer who buys locally, it indicates that the average dealer buys in much larger quantities than he should. When you consider also that a considerable proportion of the average dealer's business is the sale of labor, on which he gets a turnover of at least twelve times a year, if he watches collections, the comparison between the jobber's turnover reflects discredit upon the dealer. This is a situation which the dealer can easily rectify. I am not prepared to say just how many times a year a dealer should turn his stock. The dealer in Portland should get a better turnover than the country dealer because he is closer to the source of supplies—the jobber.

Turnover and Profits

It has been said that the A B C of good merchandising is quick turnover and small profits. A few of the cigar stores in the United Cigar store chain have made as high as 50 turnovers in a year's time. A net profit of ½ of one per cent on sales on such a rate of turnover would yield 25% of the retail value of the stock. Of course it is not likely that anyone in the electrical business is going to get 50 turnovers in a year's time, but the principle still holds. I can show this better with merchandise that we are all familiar with. For example, take a portable lamp or fixture which the dealer pays $5.00 for. We will suppose at the end of six months he sells it for $15.00. This is a nice long profit, 66 2/3% on the selling price. Compare this with the sale of Mazda lamps at say 24% profit on the selling price, but a turnover every month. Which of these two transactions gives the largest return on the investment? A sale of 66 2/3% which takes six months to make, or six sales at 24½? Putting this in actual money, the $15.00 fixture sale gives a gross profit of $10.00, the sale of $15.00 worth of lamps each month gives a gross profit of $3.33 1/3 each month or $20.00 in six months,—just twice the profit made on the fixture. To make as much on the fixtures as on the Mazdas you would have to get $25.00 for the fixtures that only cost you $5.00. This is five times the cost.

Where the Profit Comes In

The profit in any business is in the sale and not in keeping the merchandise. The more sales you make in a given time, the more money you will make, provided of course that you are not doing business at a loss. If you should happen to be making these sales at a loss, not getting what the merchandise costs, plus what it costs to sell it, the high rate of turnover will bring your business to bankruptcy just

that much quicker. The slow rate of turnover of most electrical contractors is probably the reason it takes them so long to go broke. These are all things that most of us know in a general way. When you do get stuck with something that won't sell quickly, it is best to take a loss, charge the profit you should have made up to experience, and reinvest the money in something that will sell quickly and earn something for you.

Selecting the Stock

One of the first steps towards improving your turnover is in buying properly. It is impossible to buy properly without some information as to what your sales of each article are. This information can not be obtained without a considerable amount of work on the part of some one, and this work constitutes an expense, but the information will enable you to do the same amount of business on a considerably smaller amount of capital, and will more than pay for itself. The information together with the amount on hand when inventory is taken will enable you to figure your sales at any time by counting what you have on hand. Usually when ordering more material, the stock on hand is low and it is very little work to count what is in the bin, and determine your sales since you last bought. I have tried out several forms of stock records, and find that the card index entails the least amount of work. A card is made for each item that is carried regularly in stock. This card gives the name and number of the article, the maximum and minimum amount of stock, amount to order and location in stock room. In some instances we leave these blank, in others the minimum is shown below which the stock is not allowed to go. In other cases the amount to order is shown. This card has columns for the amount ordered and date, amount received and date, the cost both factory and landed, amount on hand, value, and amount used. Once a month or when the stock is low, the stock clerk enters the amount on hand. From this the amount sold or issued is easily determined covering any definite period. It is not necessary to check slow moving stock more than two or three times a year. Basing your future sales on what you have sold in the past, with of course due consideration of a continued demand, it is a simple matter to determine how much to order for any given period.

Where Small Orders Pay

Take sockets for an example. Suppose you determine from your stock cards your sales are approximately 200 per month. Buying in carton lots you would get twelve turnovers per year. Your profit when you buy on this basis and sell for 50 cents each is 40% on each sale or with 12 turnovers, 480% on your investment valued at selling price, in a year's time. By buying these sockets in case lots of 500 you get a 10% better price, or 50% on each sale. However this will reduce your turnover from 12 times per year to 4.8 turnovers per year. 4.8 turnovers at 50% is only 240% on your investment at selling price in the year's time. This figures in actual money as follows: In the first case you buy 200 sockets. The retail value is $100.00, they cost $60.00, giving you a profit of $40.00 per turnover, or $480.00 in a year's time on 12 turnovers. In the second case you buy 500 sockets, the retail value is $250.00, on a 50% margin they cost $125.00, and you can make a profit of $125.00 per turnover, at 4.8 turnovers or $600.00, but your investment is 2½ times as great. Reducing this to a percentage, $600.00 received on an investment of $250.00 gives 240% as against 480% in the first case. From this it is quite evident that until you have sufficient capital to invest in your business, it will pay you under the above circumstances to pay 10% more and get a better turnover. With this table it should be easy to figure in each individual case just what is the proper quantity to buy. However it is necessary to know what your average sales amount to, and some sort of a stock record is essential to give this information.

The Role of Advertising

Another method of improving turnover, is to improve your sales. A great deal can be done through proper advertising. I believe most of the electrical dealers do not appreciate the real value of good advertising. Many dealers look upon advertising as an item of expense pure and simple. There is no doubt that it is part of your overhead expense. The salary of your salesman in the store is an expense, but you wouldn't try to do business without salesmen in your store. Your rent is also a necessary expense. A good salesman in your store will sell more goods than a poor one. By selling more goods your percentage of overhead expense is less, the cost per sale is less. The proportion of the rent per sale is less.

Good advertising works in the same manner. It will reduce your overhead expense and your unit cost to sell by increasing your volume of business. You will note that I have referred above to good advertising. There is no doubt that poor advertising is a waste of good money. The difference between good advertising and poor advertising is often very slight. The change of a word or two often will change the pulling power of advertising. Sometimes it is necessary to experiment a little to determine what is the best method of advertising. Persistent advertising will undoubtedly bring better results than an occasional hit-and-miss advertisement now and then. It is my experience that it pays to have your advertising copy written by some one who understands the advertising business. It is better to pay a little more to some good advertising agency and have the copy right, than to try to save by preparing your own copy, and not have it right. You are all familiar with the saying that a man who is his own lawyer has a fool for a client. This often holds true in advertising. The men who make this their business are in a better position to know what is good and what is'nt.

Cheap Help Expensive

I believe the electrical dealers often depend upon too cheap help in the stores. A $75.00 salesman in the store may serve to hand out the goods and get the money, while a $100.00 man may double the sales. The sale of two washing machines from the store would pay the difference in salary, a third ma-

chine sold by the better man would make the $100.00 man more profitable than the cheaper one. The cheap man will lose sales that the good salesman will get, and it doesn't take a very big volume of business to pay the difference, and reduce your overhead expense.

Collections Complete Sale

Your rate of turnover also depends upon your collections. A sale is not complete until the money is collected. You are all familiar with this phase of the business. It is one that takes constant attention from some one. When the job is done, don't be afraid to go after the money. The man who pays his bills expects to pay when you have done your part. The man who doesn't expect to pay is the man you want to find out as soon as possible. The matter of collections is not within the scope of this paper, and I merely mention this in passing as it affects your turnover.

The Selling Price and Turnover

The next and last point that I want to bring out is that in marking up goods for resale the question of turnover plays an important part. If the goods are fast moving they can be sold on a closer margin than the slow moving stock. To determine just what this difference is, it is necessary to have more information than is at present available. This information to be of value should come from a great many dealers. To make clear what I am driving at I will take a hypothetical case. Suppose a contractor dealer has an average stock of $3000 and is doing a gross business of $15,000 a year; this means an average turnover of 5 times per year. We will assume his overhead expense is 30%. He should be entitled to a profit of 15% at least on his investment of $3000. On this basis he must sell his merchandise on a 33% basis figured on selling price. 30% of this to take care of his overhead and the 3% turned five times per year to make the 15% on his investment. As a matter of fact he will have some merchandise—labor and Mazda lamps are examples—on which he will get better than 5 turnovers, probably ten. These items he can handle on a closer margin, provided he handles the slow moving part of the business on a greater margin to make up for this. If 5 turnovers per year returns 33% necessary to show the required margin of profit on material, with 10 turnovers he can handle at about 16 2/3%. On material that turns three times per year he must get better than 50%. On material that only turns two times in a year he must get 80% on selling price, or five times the cost.

The present method most of us are using in determining selling prices does not take into consideration the difference in turnover of various kinds of merchandise. For this reason I think that most of us are making one part of the business bear a greater burden than it should, and we are selling slow moving merchandise at a price much less than we should to bear its proper share of the burden. Of course to get the proper mark up we should analyze our business to such an extent that we can determine the cost to sell each class of merchandise, add to that the interest on the money tied up for the length of time it takes to sell, and a profit on top of that.

To Collect Data

Before we can get very far along these lines it is going to be necessary to collect data covering a number of years from a large number of firms to get a fair average. The time to start collecting this information is now; I believe the secretary's office should keep this data on file and every contractor-dealer should submit all information regarding his business possible.

If this information were available today, it is possible that we could go before the Federal Trade Commission and get their approval of a resale price list. We could also go before the manufacturers that are not allowing a sufficient margin for the dealer, with facts to convince them that the dealer is entitled to a larger profit. If we as an association ever expect to improve the condition of our members, it is time to start conducting our business in such a manner that this information will be readily available, and when requested by the secretary, to furnish it promptly for the benefit of us all. I can see no reason why the Oregon Association should not start collecting this data at once. If the members really want it, there will be little trouble in getting the information.

RETAIL MERCHANDISING BY THE ELECTRICAL CONTRACTOR-DEALER

BY B. W. PAUL

(Do you close your store during the busiest afternoons of the week? Are you unable to demonstrate your electrical ware owing to absence of outlets? The practical need of a sane merchandising policy is here pointed out by the proprietor of a successful electric store in Medford, Oregon. The paper was one of the most interesting presented at the Portland Convention of Oregon Contractors & Dealers.—The Editor.)

The more I study the dealer's problem the more I am convinced that we have a real man's job to make a success of our business and do our part in the industry.

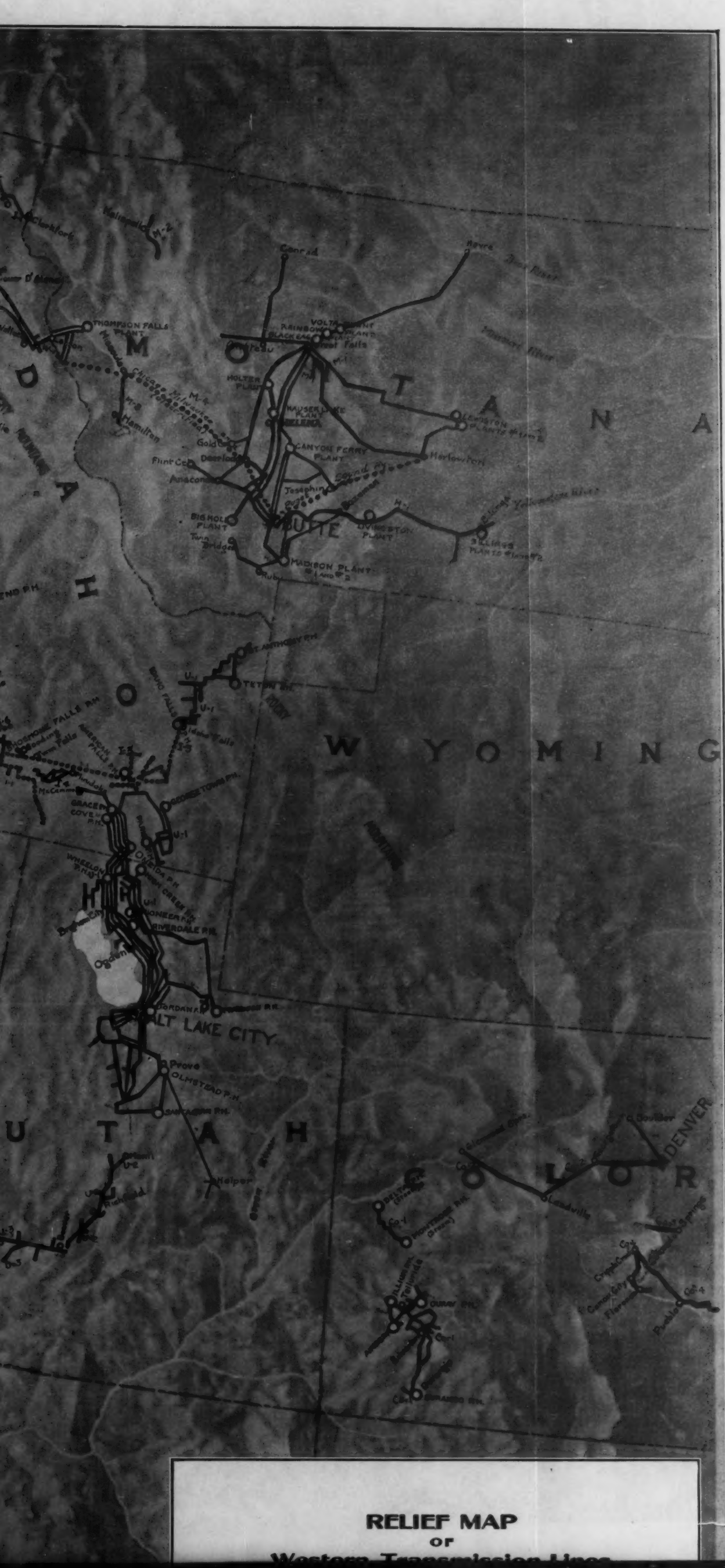
We dealers owe the public the labor saving devices in this time of war, we owe the Government money to carry our war to a successful victory. We owe Red Cross, Y. M. C. A. and other organizations money for relief work and entertainment for our men "Over There."

We can help furnish this money by cutting down our expense—that is, saving in cost of operation of our business,—and we are slackers if we waste our opportunities to do all we can.

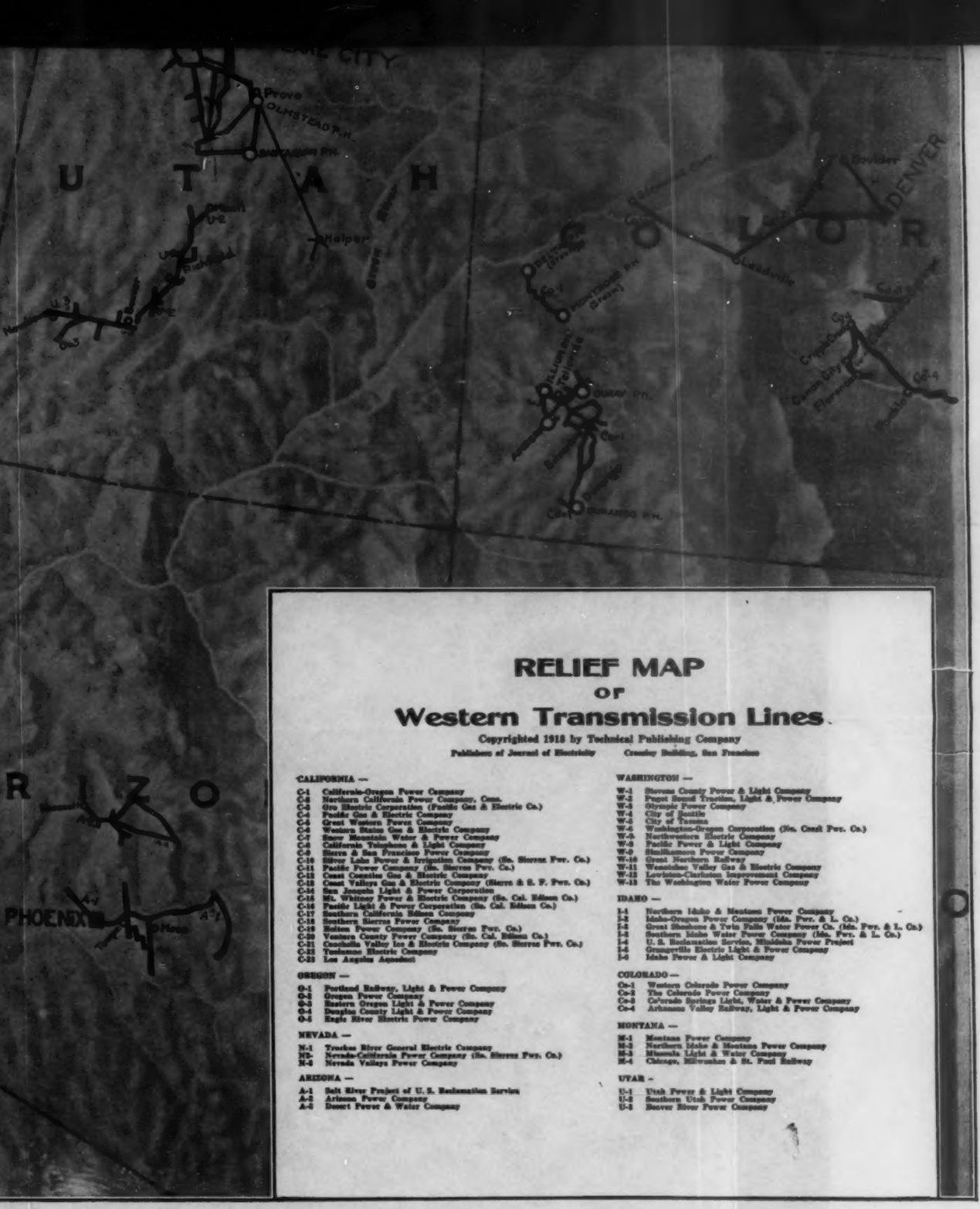
Merchandising is profitable when proper methods are used and we should make the most of it to help Uncle Sam and conserve labor. Let me outline the general plan I have in mind.

1st. Maintain a policy.
2nd. Estimate our costs beforehand.
3rd. Know our costs and really analyze our business.

SEATTLE
WASHINGTON
SPOKANE
PORTLAND
OREGON
SALEM
SPRINGFIELD PH.
Roseburg
Medford
EUREKA
KILARC P.H.
SOUTH COW P.H.
ALTA P.H.
DE SABLA P.H.
BIG BEND P.H.
COLGATE P.H.
SPAULDING P.H.
ALTA P.H.
Auburn
Placerville
ELECTRA P.H.
STANISLAUS
SAN FRANCISCO
Merced Falls
Santa Cruz
Monterey
San Luis Obispo
Santa Barbara
60000 V.L. line
Lovelock
Reno
Wonder
Fernley
Fairview
MILLER P.H.
Goldfield
Tonopah
Belmont
Manhattan
Round Mountain
Independence
Rhyolite
Los Angeles
San Bernardino
BOISE
Payette
Weiser
Baker City
La Grande
Grangeville
Lewiston
Clarkston
Coeur d'Alene
Wallace
Kellogg
Newport
Colville
Kettle Falls
Republic
Chelan
Wenatchee
Ellensburg
Yakima
Walla Walla
Pendleton
The Dalles
Hood River
Oregon City
Astoria
Longview
Centralia
Chehalis
Olympia
Port Angeles
Port Townsend
Bellingham
Everett
Tacoma
Kelso
Vancouver
Portland
Klamath Falls
Lakeview
Alturas
Susanville
Quincy
Oroville
Chico
Red Bluff
Ukiah
Willits
Fort Bragg
Santa Rosa
Petaluma
Stockton
Modesto
Los Banos
Coalinga
Taft
Bakersfield
Mojave
Barstow
Victorville
Riverside
Pasadena
Glendale
Burbank
Hollywood
Santa Monica
Long Beach
Redondo
Oceanside
San Diego
Yuma
Phoenix
Prescott
Flagstaff
Kingman
Las Vegas
Boulder City
Needles
Blythe
Indio
Palm Springs
Brawley
El Centro
Calexico
Mexicali
Tijuana
Ensenada
Salton Sea
Imperial Valley
Colorado River
Boulder Dam
Parker Dam
Parker PH.
Horseshoe Bend P.H.
Oak Bow
Drain
Elmo
Corco P.H.
Dunsmuir
Kilarc P.H.
Cow Creek
Big Bend P.H.
Alta P.H.
Colgate P.H.
Deer Creek P.H.
Spaulding P.H.
Alta P.H.
Electra P.H.
Stanislaus
Merced Falls
Kerckhoff P.H.
Kerckhoff No. 2
Kerckhoff No. 1
Big Creek No. 3
Big Creek No. 2
Big Creek No. 1
Eastwood
Balch No. 1
Balch No. 2
Kaweah P.H.
Kaweah No. 1
Kaweah No. 2
Kaweah No. 3
Hydro Plant
Mill Creek P.H.
Haiwee
Control Gate
Owens River
Aqueduct
Los Angeles
Haiwee Reservoir
Fairmont Reservoir
Jawbone
Antelope
Tehachapi



RELIEF MAP
or
Western Transmission Lines



RELIEF MAP
OF
Western Transmission Lines.

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Publishers of Journal of Electricity — Crossley Building, San Francisco

CALIFORNIA —

C-1 California-Oregon Power Company
C-2 Northern California Power Company, Corn.
C-3 Oro Electric Corporation (Pacific Gas & Electric Co.)
C-4 Pacific Gas & Electric Company
C-5 Great Western Power Company
C-6 Western States Gas & Electric Company
C-7 Sierra Mountain Water & Power Company
C-8 California Telephone & Light Company
C-9 Sierra & San Francisco Power Company
C-10 Silver Lake Power & Irrigation Company (So. Sierras Pwr. Co.)
C-11 Pacific Power Company (So. Sierras Pwr. Co.)
C-12 Coast Counties Gas & Electric Company
C-13 Coast Valleys Gas & Electric Company (Sierra & S. F. Pwr. Co.)
C-14 San Joaquin Light & Power Corporation
C-15 Mt. Whitney Power & Electric Company (So. Cal. Edison Co.)
C-16 Pacific Light & Power Corporation (So. Cal. Edison Co.)
C-17 Southern California Edison Company
C-18 Southern Sierras Power Company
C-19 Edison Power Company (So. Sierras Pwr. Co.)
C-20 Ventura County Power Company (So. Cal. Edison Co.)
C-21 Coachella Valley Ice & Electric Company (So. Sierras Pwr. Co.)
C-22 Tuolumne Electric Company
C-23 Los Angeles Aqueduct

OREGON —

O-1 Portland Railway, Light & Power Company
O-2 Oregon Power Company
O-3 Eastern Oregon Light & Power Company
O-4 Douglas County Light & Power Company
O-5 Eagle River Electric Power Company

NEVADA —

N-1 Truckee River General Electric Company
N-2 Nevada-California Power Company (So. Sierras Pwr. Co.)
N-3 Nevada Valleys Power Company

ARIZONA —

A-1 Salt River Project of U. S. Reclamation Service
A-2 Arizona Power Company
A-3 Desert Power & Water Company

WASHINGTON —

W-1 Stevens County Power & Light Company
W-2 Puget Sound Traction, Light & Power Company
W-3 Olympic Power Company
W-4 City of Seattle
W-5 City of Tacoma
W-6 Washington-Oregon Corporation (So. Coast Pwr. Co.)
W-7 Northwestern Electric Company
W-8 Pacific Power & Light Company
W-9 Shelhamers Power Company
W-10 Great Northern Railway
W-11 Wenatchee Valley Gas & Electric Company
W-12 Lewiston-Clarkston Improvement Company
W-13 The Washington Water Power Company

IDAHO —

I-1 Northern Idaho & Montana Power Company
I-2 Idaho-Oregon Power Company (Ida. Pwr. & L. Co.)
I-3 Great Shoshone & Twin Falls Water Power Co. (Ida. Pwr. & L. Co.)
I-3 Southern Idaho Water Power Company (Ida. Pwr. & L. Co.)
I-4 U. S. Reclamation Service, Minidoka Power Project
I-5 Grangerville Electric Light & Power Company
I-6 Idaho Power & Light Company

COLORADO —

Co-1 Western Colorado Power Company
Co-2 The Colorado Power Company
Co-3 Colorado Springs Light, Water & Power Company
Co-4 Arkansas Valley Railway, Light & Power Company

MONTANA —

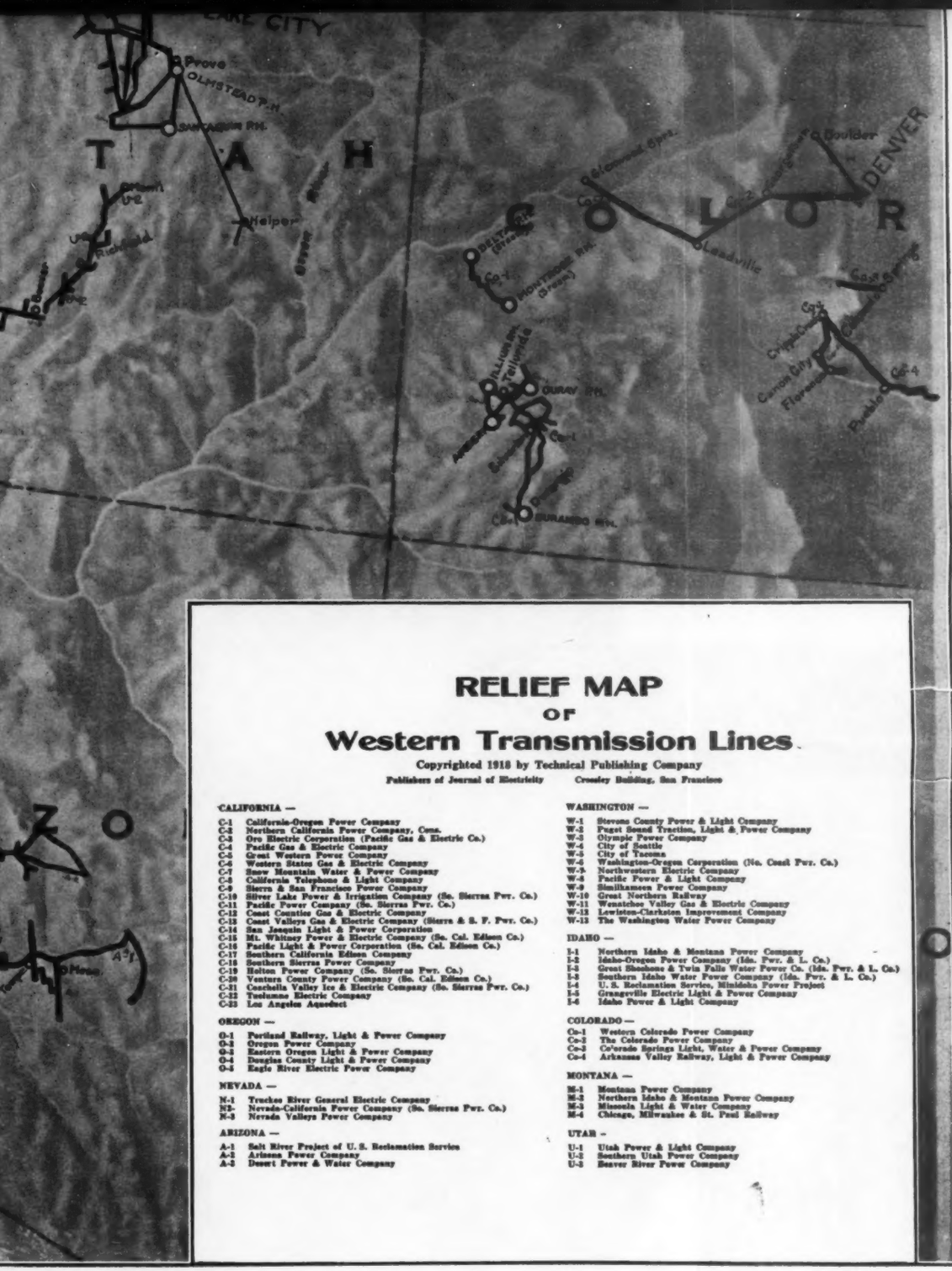
M-1 Montana Power Company
M-2 Northern Idaho & Montana Power Company
M-3 Missoula Light & Water Company
M-4 Chicago, Milwaukee & St. Paul Railway

UTAH —

U-1 Utah Power & Light Company
U-2 Southern Utah Power Company
U-3 Beaver River Power Company

CTOBER 15, 1918 — COMMEMORATING THIRTY-ONE YEARS OF SERVICE IN THE WEST
ny, Crossley Building, San Francisco

SUPPLEMENT TO THE JUBILEE ISSUE OF THE JOURNAL OF ELECTRICITY, OCTOBER 15
Technical Publishing Company, Crossley



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C-9 Sierra & San Francisco Power Company
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C-16 Pacific Light & Power Corporation (So. Cal. Edison Co.)
C-17 Southern California Edison Company
C-18 Southern Sierras Power Company
C-19 Holton Power Company (So. Sierras Pwr. Co.)
C-20 Ventura County Power Company (So. Cal. Edison Co.)
C-21 Coachella Valley Ice & Electric Company (So. Sierras Pwr. Co.)
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W-11 Wenatchee Valley Gas & Electric Company
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15, 1918 — COMMEMORATING THIRTY-ONE YEARS OF SERVICE IN THE WEST

y Building, San Francisco

SUPPLEMENT TO THE JUBILEE ISSUE OF THE JOURNAL OF ELECTRICITY, OCTOBER 15, 1918—
Technical Publishing Company, Crossley Building,

Let's make it our policy to open up a retail department, but do not try to operate your contract and retail departments together. It is impossible to mix the two and make a success of either. Do not allow any man to supervise workmen, figure jobs or wear overalls while trying to wait on the public. You are sure to have confusion and you cannot wait on a customer properly and have other things on your mind.

Don't employ cheap store clerks. We are mighty quick to criticise the department stores for handling electrical goods and not employing electrical people who can tell the public facts about the appliances, and the electrical dealer today is making the mistake he accuses the department store of making. Portland is doing it, and even Cleveland is doing it.

I took occasion to visit a number of stores on my trip East and found the door of the first one I visited in Cleveland locked at 4 o'clock Saturday afternoon while there were thousands of people passing. On making inquiry I found about three-fourths of the electrical stores close Saturday at noon as they claim it doesn't pay to keep open all day Saturday. Yet the department store and all other stores on either side were crowded with customers.

In the next store I found a man with a cigar in his mouth trying to sell a washing machine to a woman.

Can you imagine your home town department store closing Saturday afternoon or a salesman in a ladies' department smoking while trying to sell a lady's suit?

Something wrong in policy.

I next visited the washing machine section of one of the largest department stores in Cleveland and found about five makes of washers and none of them connected to a socket.

I asked, "Are these run by hand?" and the salesman said, "Oh, no, they run by electricity but we have no sockets here to connect them to."

But don't think that these department store managers won't learn, and when they do they will keep us on the go.

We dealers should employ higher priced clerks than is common among us. Why do we pay $50 or $75 a month to a clerk to drive trade away when we should pay from $75 to $150 to bring trade in and also keep what we have secured by advertising and other means. Go into the average store where you are unknown and you will understand what I mean by this.

Don't neglect Service on appliances. Satisfactory service of any appliance sold may influence other sales and if it does cost a couple of dollars to cross the town and show Mrs. X. how to get more out of the electric washer you've just sold her, remember if she is enthusiastic it is money well spent if her enthusiasm sells one or more washers for you, and she will do it if you handle the situation properly.

There is a certain dealer in Omaha who has sold 1900 electric washers in three years' time and if he can do that in Omaha we can do something in Oregon.

We should know definitely what it costs to maintain our retail department, also if we are guilty of any one error in our business, I believe the one of trying to make our average gross profit, or better, on every article we handle is the greatest. It is a natural tendency, of course, but not logical. The grocer doesn't make his large profit on staples such as salt and sugar, which sell themselves, but rather on articles which require sales effort. Now if you will segregate your overhead costs into parts you can readily determine what pro rata of overhead expense the various lines should carry.

Then mark your goods for a proper margin and keep in mind turnover. A good merchant does not carry slow moving stock long if he can help it.

Remember, you do not have to buy washers, irons, grills, and many merchandise appliances in quantities to get the best price. Buy with the idea of quick turnover.

With this in mind and knowing your overhead cost for various lines, you then have a definite basis on which to work. Your salesmen should know how much is expected of them and a record, month by month, year by year, of your results will provide a reliable guide for the future.

I believe a standard form of overhead expense report, showing the percentage for each item as a guide, would be of material assistance, and if any of you are interested I have a set of figures to begin with. Let me outline merchandising:—

1st.	Policy.....	Retail department Efficient clerks Service
2nd.	Estimate.....	Cost of retail department % profit desired Volume of sales necessary to make a net profit
3rd.	.....	**Know** what you are doing and Keep a record of it to compare month by month

Keep in mind that a non-producer is a parasite feeding off of the efforts of others. Get into the labor saving production and don't depend on other people to stir up jobs and then go out to under-bid on the job because you think you have less overhead.

Be a producer and do your share of the work in developing a business the volume of which will average twice what the wiring of the average home amounts to.

Use the appliances you sell in your own home and be a booster from now on for:

Labor saving appliances.

Save fuel, money, food and labor by wire.

ON MAKING FRIENDS

"If I were asked to give advice to a group of young folks who wanted to get ahead in business," said a successful old man the other day, according to a magazine devoted to the interests of stationery, "I would simply say: 'Make friends.' As I sat here before the fire the other night, I let my mind run back, and it was with surprise that I learn that many of the things which in my youth I credited to my ability as a business man, came to me because I had made influential friends who did things for me because they liked me. The man who is right, has the right kind of friends, and the man who is wrong has the kind of friends who are attracted by his wrongness. A man gets what he is."

HOLDING THE CUSTOMER

BY HOMER J. BUCKLEY

(An article on why you lose your customers which shows the fault in almost every case to be one of salesmanship rather than the quality of the goods. The paper is one which was given at the recent advertising convention in San Francisco. The author is of the firm of Buckley, Dement & Company, Chicago.—The Editor.)

How many business men know that 70 per cent of the customers that discontinue buying, quit absolutely cold and never give you a chance to explain or make an adjustment and the 30 per cent who do complain, how do you treat them? The 30 per cent are, after all, your real friends, because they give you a chance to adjust the complaint—to square yourself and reinstate the house with the customer.

One of the weakest spots in business today is in the Adjustment or Claim Department of the average manufacturing, jobbing and retail concern—and of the Department Stores the worst of all.

If you want to get a shock—send for the files of your Claim and Adjusting Department and read over the carbon copies of the correspondence of that day—and see how your customers are being treated. If you don't find a need for "Better Letters"—the kind that will hold the customer, then your house is an exception.

You will, more likely, find cold, curt, blunt, "You-have-no-right-to-complain" letters written to your customers—customers that perhaps have been buying for years from you.

You will find eight paragraph letters written to customers — seven paragraphs devoted to reasons why the customer should not get an allowance, and probably winding up in the eighth paragraph, giving the allowance. And by the time your customer has read the seven paragraphs he is so mad he don't want the allowance given him in the eighth paragraph.

If you are going to make an allowance, for goodness' sake, make it right off the bat, and have the customer feeling right at the start.

"Holding the Customer" means establishing a followup system in your business, and one of the very first steps is the compiling and maintenance of an active and inactive list of your customers — your ledger records for a year or two years back—if you please.

Why Trade Shifts About

Why is it that customers become inactive? How many business men ever stop to analyze this important angle of their business?

Here is what one big retail specialty house found in checking back their Sales Record for eighteen months, and compiling a list of active and inactive accounts—taking as a basis any customer who had not purchased within a year as an inactive account.

Out of a total of 2,800 elite customer names, they found 300 inactive. Why had they stopped buying? A carefully prepared letter was sent to each name, making inquiry as to why they had discontinued buying.

This letter was signed by the president of the firm, with a self-addressed stamped envelope enclosed. One hundred and ninety-six replies were received and they were tabulated, and the answers classified in order as follows:

47—Indifference of salesmen.
24—Attempts at substitution.
18—Errors.
18—Tricky methods.
17—Slow deliveries.
16—Over-insistence of salesmen.
16—Insolence of employes.
13—Unnecessary delays in service.
11—Tactless business policies.
9—Bad arrangement of store.
6—Refusal to exchange purchases.
1—Poor quality of goods.

Only one answer has to do with merchandise—while all the others discontinued as customers because of dissatisfaction with service in its broad sense.

This was a startling revelation for this house, and a plan was inaugurated at once to maintain, as a permanent policy of the house, a careful follow-up on all inactive accounts.

Customers change from one house to another for some of the most petty reasons imaginable—and mistakes and dissatisfaction are bound to occur just as long as we have to deal with the human element in business.

There never was a better time than now, as an economical measure of safety and conservation in selling, for every business institution to give closer attention to a plan of "Holding the Customer"—and to persistently follow-up all accounts and keep them active.

Among other things it means training your correspondents in the Claim, Adjusting and Credit Department in the art of Better Letter writing. If there were ever a class of people who need this training, it's the Claim and Credit men.

One of the big glove manufacturing and jobbing houses of Chicago—Francis T. Simmons and Company—has made quite a success in following-up inactive accounts—in fact, they keep everlastingly at it—with a series of Sales letters, offering merchandise inducements. Early last fall they sent out the following letter to 1,400 customers—dealers—mostly general store merchants in small towns, who had not purchased for over a year. They received 385 replies and a total of $10,500 in orders. It cost less than $100 to send out the letters, postage and all.

Here's the letter:

Dear Sir:

Ever had a good customer suddenly quit buying goods in your store? If so, what did you do? You waited until you saw him again and then said, frankly: "We haven't seen you in the store lately, Mr. Jones. What, if anything, is the matter?"

You went at him **straight from the shoulder** in an attempt to find the real reason why he quit you. Then Mr. Jones probably told you **equally frankly** his reasons. If his complaint was a just one and you had made a mistake, or had been wrong—we're none of us perfect—you did your level best to make amends.

That is just the attitude in which I am writing **you** this morning. I **can't see** you face to face, but I can **talk** with you. We haven't had an order from you for some time and I would certainly appreciate it if you told me "right out in meeting," **why not.** If any department of this business has failed you I want to know it.

The fact that this business isn't **perfect** is surely not due to any lack of effort on our part, or because we aren't trying to make it so. Changing war conditions have not as yet found us unprepared to take care of our trade. And furthermore, never have we lost sight of our customer's

interests. We will be in business after the war and will need customers then more than we need goods even though just now it's the other way.

Just put yourself in my place for a minute or so. Turn this sheet over now, and answer this letter as you would like to have it answered if you had written it. Don't mince words. Give it to me "hot off the bat." Enclosed is a stamped envelope to make an answer convenient.

I am looking forward to hearing from you with the keenest interest.

Very sincerely,

P. S.—I am enclosing two yellow order blanks. If, as I sincerely hope, nothing whatever is wrong, and you have merely overlooked filling in your stock, these blanks will be an easy way for you to tell us your needs. Any gloves that we send you must please you, your salespeople and your customers, or we do not expect you to keep them.

Note particularly that the appeal for the order was in the postscript of the letter, indicating that the letter was read all the way through.

This is the type of a letter that gets close to your customers—makes friends—and brings them back in the fold again—permanently.

Mr. W. B. Simmons, the author, has certainly shown by the above letter that he understands the three fundamental elements in the art of writing sales letters, namely:

1st—Those which appeal to the emotions.
2nd—Those which appeal to the intellect.
3rd—Those which appeal to the will, but more than anything else it was the "personal play" in this letter that was responsible for the volume of business secured.

Remember, the 70 per cent who discontinue as customers quit cold. By the regular use of better letters you can detect a grouch or complaint and remedy it, and bring back many a dissatisfied customer.

Technical Hints

BY GEORGE A. SCHNEIDER

(A simple and yet accurate record of money paid which will take the place of receipted bill files and other cumbersome records is recommended in the "voucher-check." A table of bushings which will prove of value to the contractor and a suggestion of applying the labor-saving argument to the motor repair shop. The author, who is well known to the electrical industry in the West, is now at the head of the Buffalo office of the Western Electric Company.—The Editor.)

Voucher Check

The voucher check is a business instrument which could be adopted to good advantage by many dealers and contractors who are not now using it in making their remittances. Without doubt, this form of check would be more largely used if its advantages were better known and appreciated.

Method of Making Remittances

In checking over an assortment of remittances such as are daily received by any large business institution it is indeed surprising and interesting as well to note how careless this very important part of the business transaction is frequently handled. Many of the larger concerns use the voucher check system, but hundreds of smaller dealers or concerns do not; in fact, many of them are not at all familiar with this form of check.

Some concerns enclose a letter giving complete reference to the invoice to which their payment applies, including such information as the amount of the invoice, its date, its number and reductions taken, such as cash discounts, freight allowance or credits. In some instances, however, the amounts only are specified; in others, the dates are included and occasionally only the invoice number is given.

Quite similar to this, is the practice of enclosing a separate form giving reference to the invoice to which the check applies, or enclosing a copy of the invoice or invoices being paid with the check. Still another practice and one which carries a great deal of trouble is, that of simply mailing a check to apply on the account without any statement whatever as to what invoices it should be applied. This is indeed poor practice, and the one that most needs attention.

Any system of making remittances that gives sufficient information so that payments may be properly applied against the various invoices or accounts, is, of course, satisfactory to the creditor. Whether or not it will be best for the debtor, depends upon the manner in which his books and records of his accounts and remittances are kept.

Making remittances by enclosing a letter, form or copies of invoices with the check has, of course, the disadvantage that these may become separated and the creditor has difficulty in applying payments against the account.

Advantages of the Voucher Check

Any system of making remittances that is so incomplete that the creditor cannot properly apply the payments will, of course, make further trouble for the debtor, as he will ultimately be obliged to give further or more complete details regarding the accounts against which the payments are to be applied. Further, the debtor must also, of course, have some system of keeping a record of his payments. Both the keeping of the records and making payments involve more or less detail work, so the simpler the system, the better it is and less expensive it is to operate.

Many small concerns or individuals keep very poor records of their remittances, especially those who may have no regular bookkeeping or office force to handle such details, and as a result in case a receipted invoice or a similar record of payment is lost or misplaced, they have no means of knowing whether a particular invoice has been paid or not. This very frequently leads to unpleasant disputes, and a lot of work as well.

Practically all of the difficulties noted and much unnecessary work and expense can be eliminated by the adoption of the voucher check system. It has many advantages over the regular form of check. It will eliminate letter writing, filing of receipted bills and other detail work, and when returned by the bank, gives an indisputable receipt—an absolute positive evidence of payments made, and the invoices to which they apply.

The voucher check is like any other one, except it has a space for recording the particular invoice or accounts against which it is to be applied. There are many forms of these checks. The simpler forms have an extra space at the left on the front side of the check where the various notations such as invoice number, dates of invoices, cash discounts or other deductions can be shown, or have space for the same

purpose on the reverse side of the check. The more elaborate forms have a voucher actually attached. making them much similar to a set of two checks attached to each other. With these, two different practices are followed. In one, the voucher part of the form is detached by the payee and kept by him until it has served the purpose of his office in applying the remittance against the proper items on his books, while the check part of the form is deposited in the bank and later returned to the debtor. This form requires that the debtor keep some separate record of the remittance. The other practice is to keep the voucher and check parts of the form intact, so that when they are returned from the bank they become a complete permanent record of the payment. In this case, of course, no part of the form is kept by the payee. The notations as to which items are paid by the check must be made before it is sent to the bank.

Application of Payments

There is another interesting point in connection with the general subjects of payments that should be noted at this time, that is, the question as to the application of part payments made by a debtor who owes several distinct debts to the same creditor. Three rules of application have been established by the courts. These are stated in a very concise and simple manner by B. A. Brennan in an article on Sales Contracts appearing in the Electric Journal, as follows:—

First—The debtor has the first right to say to which debt the payment shall be applied, and any creditor accepting the payment made, qualified as to its application, is bound to apply it as directed.

Second—If payment is made without any directions expressed or implied, the creditor has the right to apply it to any debt due him from the debtor, but it must be a just debt and not disputed.

Third—When neither party has elected on any specific application, the payment is presumed to apply to the oldest debts.

It is well to note that in all cases, if the parties themselves have omitted to make specific appropriation of payments, the law will appropriate them, according to the justice and equity of the case for the benefit of both parties.

NOTES ON DRILLING AND BUSHINGS FOR CUT-OUT BOXES AND CABINETS

When selecting insulating bushings for wires which enter cabinets, cut-out boxes or junction boxes, there are two questions which are always brought up.

First—The size of bushing required for a given size of wire.

Second—The size of hole required for the bushing.

One who has occasion to order bushings right along soon remembers the various sizes required, but where these are handled only occasionally, a lot of measuring and checking up of dimensions may be required to secure the right combination of bushing and size of hole in cabinet or box.

In checking over the price lists and dimension sheets issued by several manufacturers of porcelain bushings for this purpose, the writer noticed none of them gave complete information as to the size of wire that may be used for the various bushings and the size of knock-outs required for the bushings. One manufacturer gives the general dimensions of his bushings and the wire sizes while another gives similar dimensions for the bushing and the equivalent size of conduit knock-out required for them. By combining this information from the two manufacturers, we can arrive at a table which really gives the information needed to select bushings and size of knock-outs for them.

Two tables of this kind were recently compiled in the office with which the writer is connected. These are given in the following paragraphs.

Table 1 covers the well known Federal clamp bushings, while table 2 applies to the Detroit bushings supplied by the Square D Company, formerly the Detroit Fuse and Manufacturing Company.

Table 1—Federal Bushings

Cat. No.	Diameter wire hole inches	External diameter of shank, inches.	(a) Size of knock-out equivalent size conduit, inches.	(b) Maximum size of R.C. wire.
A-1	9/32	41/64	(c)	No. 10 S.B. solid
A-1½	9/32	13/16	1/2	No. " " "
A-2	13/32	13/16	1/2	No. 8 S.B. solid
A-3	9/16	1	3/4	No. 3 D.B. stranded
A-4	3/4	1- 5/16	1	No. 00 " "
A-5	1- 1/8	1- 5/8	1 1/4	450,000 C.M. "
A-6	1- 5/8	2- 1/4	2	1,000,000 C.M. "

Table 2—Detroit Bushings

17111	5/16	13/16	1/2	No. 10 S.B. solid
17112	13/32	13/16	1/2	No. 8 S.B. "
17212	13/32	1	3/4	" " "
17213	9/16	1	3/4	No. 3 D.B. stranded
17414	3/4	1- 1/4	1	No. 00 " "
17416	1- 1/8	1- 5/8	1-1/4	450,000 C.M. "

(a) Size of knock-out required, expressed in terms of equivalent conduit size. Note particularly, this is not the actual diameter of the hole.

(b) Size of wires approximate only as outside diameter of wires vary slightly according to manufacture and whether wire is solid or stranded, or single or double braid. The A-2 or catalog 17112 and 17212 bushings will accommodate No. 6 wire of some manufacturers. Should not be selected without trial.

(c) This bushing fits in 5/8-inch diameter hole. It is largely used for drop cords including re-enforced cord.

LABOR SAVING MACHINES FOR THE MOTOR REPAIR SHOP

Because of the shortage of labor, the difficulty in securing experienced workmen, the high wage scale in effect and the fact that repairs are now generally wanted in a rush, this seems like a most propitious time for the owners or managers of electrical repair shops to make a thorough study of the possibilities of introducing more labor saving machines into their establishments.

In the past, the first cost has prevented the introduction of some of these machines; at least, into the small shops. Now, however, the first cost becomes a smaller factor, because of the increased labor cost entering into repairs and the corresponding greater saving that can be effected by labor saving machines.

The facts given in a catalogue recently issued by one of the leading manufacturers of coil winding, coil taping and similar machines for the electrical repair shop bring out some startling figures as to the saving made possible by these machines; in fact, it would seem that any of them would yield a handsome return on the investment, even if purchased at double the prices quoted.

WAR EMERGENCY DEMANDS ON WATER RIGHTS AND SERVICE

BY S. T. HARDING

(Acting under the combined influence of the necessity for maximum food production and of the unusually low water supply on many streams and canal systems in 1918 the distribution of water for irrigation and power has been handled under emergency methods of control very different from those developed under pre-war conditions. The following article describes some of the more notable instances which occurred in California in 1918. The supervision of such emergency work was carried out very largely by the Food Administration, the Railroad Commission and the State Council of Defense with the cooperation of the various interests concerned.—The Editor.)

The Year's Situation —

There are two outstanding general factors in the irrigation situation in California in 1918 both of which have required departures from the usual methods of distributing water from streams and from canals. These two factors are the need for maximum food production, particularly of certain types of crops, and the unusually low flow of the streams. Both of these conditions required changes from former practices if the best results in crop production were to be secured. The situation was met under a number of canal systems by methods which would have been considered drastic and practically unenforceable under normal conditions but which under the war emergency existing in 1918 were not only acquiesced in by the parties affected but were carried out largely with their assistance and cooperation.

Service Without Obligation —

In order to protect a land owner in his right to secure water for his lands, the laws of California, in common with other states, provide means of recovery against a canal company for undertaking to serve more land than their available water can supply and creating obligations for service where delivery of water has once been undertaken. The effect of such restrictions in securing maximum areas of crops during the war was quickly recognized by the California legislature which passed in 1917 an act permitting canal companies to deliver excess water to new lands without creating a permanent obligation for service or without requiring payment at the same rates as those charged to other consumers. Under this provision various canal companies have served additional areas, in some cases giving full service, in others giving such water as might be available during the season of high water.

Present Not Prospective Injury —

The process of acquirement of appropriation rights and the protection of riparian rights has caused many companies to jealously guard their claims against encroachment by those acquiring new rights. This has led in some instances to the securing of injunctions against new diversions where the injury was prospective rather than present or where the injury was relatively small. The point of view in regard to such preventative measures has been gradually changing and a more definite showing of actual injury is now required than was formerly the case. The changing point of view of even those controlling the old rights is illustrated in the case of Kings River.

The Lake Lands Canal was completed in 1904 at a cost of about $250,000 for the irrigation of lands south of Kings River extending around the margin of Tulare Lake. On the completion of the canal an injunction was secured by the owners of riparian and appropriation rights on Kings River under which the Lake Lands Canal was prevented from taking any water from the Kings River at any season. This injunction had stood until 1918 when a modification of its terms was secured by stipulation of the parties interested under which diversion by the Lake Lands Canal during the war is permitted whenever the flow of Kings River exceeds the needs of all other users on Kings River, which for the purposes of the stipulation is taken as 8000 second feet. Under this stipulation water was diverted from Kings River through the Lake Lands Canal for the first time since its completion. The securing of these results was made possible by the willingness of those holding the former injunction to waive technical rights in order to more fully utilize the available water supply of the river.

Cooperation with Food Administration —

On public utility systems in California questions of rates and of service are under the control of the Railroad Commission. For such companies adjustments of methods to fit the emergency can be made by orders of the Commission. For the war emergency the Food Administration is also directly interested and its direction has been voluntarily accepted in a number of cases. This has been used in some cases to secure additional areas of crops, in others the Food Administration by stating its preference for certain crops gave the basis for priority in service under which water was distributed during periods of shortage. In the Sacramento valley rice, being a wheat substitute, was classed by the Food Administration as a more needed crop than beans or alfalfa and was given certain preference in service in some cases. Among the systems on which emergency arrangements were used were the Yolo Water and Power Company, the Sacramento Valley West Side Canal Company and the Sutter-Butte and Western Canals on the Feather River.

The Yolo Water & Power Company diverts from Cache Creek and supplies a large area, parts of which are used for alfalfa, fruit and rice. The flow of Cache Creek is not sufficient for the irrigation of all of the available lands and for several years efforts have been made to secure an agreement by which the available storage in Clear Lake might be utilized. The owners of the lands around Clear Lake and the

canal company, however, had been unable to reach an agreement. In 1918, largely through the influfluence of the Food Administration, an agreement was reached whereby the lowering of Clear Lake three feet below the outlet was permitted. The canal company installed a hastily assembled pumping plant and has been pumping from the lake. The pumped water was to be used on certain areas of rice, the returns from the sale of water to these lands to be shared by the canal company and the landowners around Clear Lake. Owing to delays in getting the pumping plant into operation, it was found necessary to divert water intended for use on alfalfa for use on rice for a portion of the season. Even with these measures it was not feasible to carry through all of the rice area which had been planted and a small proportion had to be abandoned.

The conditions under the system of the Sacramento Valley West Side Canal became such during June that priority orders were issued by the Railroad Commission giving all the water supply to rice for certain periods. The distribution of water on the system was handled for a short period by a field representative of the Commission and the Food Administration. Means of increasing the supply by a temporary dam across the Sacramento River and by additions to pumping equipment were also undertaken. All rice land was maintained, the reduction in service to other crops resulted in some reduction in yield.

Where Power and Irrigation are Involved —

On the Feather River the situation involved both power and irrigation. The Great Western Power Company, through its storage at Lake Almanor, was depended upon as the main reserve of the northern California power supply, all companies having joined a pool under the Power Director of the Railroad Commission. For power purpose this storage would be of greatest use in the fall months after the heaviest demand for irrigation had passed. At the Big Bend plant the discharge during the day fluctuates with the hourly power demand. The Western and Sutter-Butte Canals which divert below Oroville operate under such fluctuating river discharge. During June the Sutter-Butte Canal was not able to divert sufficient water for its needs and loss of crop production was feared. Following hearings before the Railroad Commission, the two canals and the Great Western Power Company agreed to the administration of the river under the joint control of the Railroad Commission and the Food Administration. As the Western Canal is not under the supervision of the Railroad Commission this action was voluntary on its part. A ruling was made by the Railroad Commission that such storage should be released from Lake Almanor as was required to save the crops under these systems.

At the time this action was taken, the irrigation of rice was backward and the demand at its peak as many of the fields were ready to begin filling. Also much land which had been in grain was ready for irrigation for beans, the period during which beans could be planted with prospects of successful yields being limited. Preference in delivery of water was given to rice, bean land being placed second and service to alfalfa and other crops being delayed for ten or twelve days. Through the cooperation of all concerned the full area of rice was maintained and service given to the bean land. The delay in irrigation of the alfalfa did not affect the yield to the same extent as under some other systems. It was found possible to avoid releasing storage from Lake Almanor above that normally being released for power except for a small amount used to maintain the minimum discharge during the low peak of the daily load. This increase of the minimum flow continued for about two weeks and while of small amount was of material benefit to the canals as it reduced the daily fluctuation in their discharge and the difficulties of controlling their distribution. By interchange of load the power use of this water was not lost. It is difficult to separate such storage release for irrigation from that released for power, the storage release for irrigation purposes was less than one per cent of the amount stored in Lake Almanor.

The General Results —

These various expedients have resulted in a more efficient use of the limited water supply available in 1918 than would have otherwise been secured. It is not possible to express the resulting increases in food production in numerical terms. The cases mentioned are only some of the more prominent ones. In addition many other similar situations have been handled by the same general methods, in some cases with the aid of public authority, in others by personal cooperation. Equivalent conditions were met in other states by similar waiving of technical rights.

Such actions upset many previous practices and customs and it is but natural to consider what the effect will be in the future when similar conditions arise but where the great incentive of the war emergency will not exist. The measures adopted in 1918 were successfully carried out because all parties recognized that the public interest controlled during the war rather than the personal interest, and that the public was alert to see that its interest was protected. Some of the actions taken in 1918 would not be desirable except under emergency conditions, those which secured public benefits without private injury will be desirable at any time.

It is difficult to see how the general results can be anything but beneficial in the future of water right development. The present experience in going directly to the result desired even though the method used may be new, will tend to remove prejudices against changes which are based merely on their newness. The use of public authority to handle matters involving public water supplies as in 1918 brings to the front the public interest in the utilization of the water resources and the right of the public interest to be more largely considered in the future than it has been in at least some cases in the past. It is to be hoped that a greater public interest in such matters may be maintained in the future after the war emergency has passed which will be exercised, not, as under necessity in 1918 to the injury of some individuals, but on a broad basis to secure greater general benefits from the use of the available water supplies.

RUSSIA TODAY AND TOMORROW

BY FEDOR F. FOSS

(Russia reorganized on a firm foundation would be the best customer for electrical ware yet unexploited. Is the case hopeless? Who is to help? The elements of the situation are here discussed by a member of the Russian Special Mission and a representative of the Russian Ministry of Commerce and Industry.—The Editor.)

What Led Up to the Revolution

Russia mobilized on the first call of the Emperor eight million soldiers of the very best quality, who started in the beginning a very brave offensive against the Germans and Austrians. When these half educated people saw that the German was a treacherous enemy, killing the wounded and torturing the prisoners, the Russian soldiers became enthusiastic and made a marvelous campaign to East Prussia and to the Karpathians, taking more than 1½ millions of Austrian and German prisoners. Through the short-sightedness and stupidity of the government they did not have enough munitions and necessary implements, and they fought bare-handed and yielded only when they had nothing but sticks to oppose to rifles.

By this campaign Russia saved France and Europe and gave to England time to prepare her army.

The above described Russia has mobilized during the three years of the war more than 16 million men and has lost seven million killed, wounded and sick.

How They Understood Germany's Peace Terms

The same Russia, after having got freedom so easily—for the autocracy fell as quickly and easily as a rotten apple falls from the tree in a slight breeze—the same Russia accepted the promises of the socialists and German spies that they would immediately receive peace, land and prosperity if they would lay down their arms. After having suffered so much from the German cruelty during the war, nevertheless they believed that it was no use to fight, that all people are brothers, that the war is a device of the emperors and capitalists to gain power and money from the blood of the people.

The poor peasants, understanding only the land question, thought that if they could have plenty of land, they did not need German land, and that the Germans would make immediate peace if the peasants would accept the principles of no annexation and no indemnity.

In the meantime, while the new born free Russian citizen talked night and day about the best principles of universal happiness, the German agents were doing their destructive work. They succeeded in disorganizing the Russian army by introducing the so-called democratic principle into the army of the election of officers. The result of his propaganda is very well known, and the Russian army of 12 million men disappeared like snow before the rising sun of Russian liberty. Most of the officers were killed and instead of the army came an armed mob which under the guidance of the extremist, the obstinate idealist and possibly of German agents, is ruling in Russia up to now.

Not Socialism but Land-Hunger

I would mention that some prominent statesmen in Russia have many times put forth the idea that it is better to leave the peasants in entire ignorance than to give them only a little education; that a small amount of education produces discontent and socialistic ideas without compensating advantages. Therefore they have hampered educational development.

The hunger for land on the part of the Russian peasant our Russian socialists have interpreted as an indication that the Russian peasant is a natural socialist. This idea was supported by the fact, as I have mentioned before, that four-fifths of Russian peasant land-holdings were held in common. But this basis is absolutely wrong, because Russian peasants are socialists up to the moment when their land hunger is satisfied. After a peasant gets the land and tills it he will not allow any socialist to take the land from him nor does he make socialistic experiments with it himself. In confirmation of this idea it can be shown that after there was promulgated a law permitting the peasants to go out of the community and settle on isolated farms, in five years three millions of peasants with eighty-six million acres settled according to the new law permitting them individual ownership.

TRANSPORTATION NOT ELECTRICAL

A means of transportation which is still in use in the southern and easterly portions of Russia. The primitive conditions still remaining in contrast to the undeveloped wealth of the nation point to the possibilities of a wonderful market when Russia really awakens.

In order to show how rapidly the peasants applied for land organization it is interesting to mention the following figures:

PEASANT APPLICATIONS FOR LAND ORGANIZATION

In 1907 applied		219,000 households
1908		380,000
1909		704,000
1910		650,000
1911		678,000
	Total 1907-1911	2,633,000
1912		1,226,000
1913		1,105,000
		4,965,000

Why the Army Returned Home

I think it is quite clear to you now, after my general, superficial review of conditions existing in Russia, that if the Russian peasant, lacking in education and especially political education, without any knowledge of real statecraft, very easily accepted the sweet propaganda which taught him "Why fight and face danger and death when you have now full liberty? Go back to your homes and take possession of the land and divide the wealth of the capitalists who are enemies of the oppressed peasants." "And go back quickly," the propagandist warned the soldiers, "before the land is all divided up among the people, and you are left out."

And in the first month the number of deserters from the Russian army was increased by two million soldiers.

The Educated Classes Today

I often hear the question, Where are the Russian intelligent classes? Why don't they help Russia to recover herself?

The answer is very easy if you know all I have told you. The proportion of educated people is very small, very much disseminated, and now for the most part killed. Therefore the Russian Intelligencia is paralyzed, and being under the suspicion of starting a revolution against the Bolsheviki, the remnant left is deprived of arms and of any means of starting anything. Even the banks are seized by the mob in order not to allow anybody to get money to start a drive against the Bolsheviki.

I could make a comparison of Russian Intelligencia, thoroughly educated but not practical and partly idealistic, to a very thin layer on the immense ocean of ignorant people. While the ocean was quiet the Intelligencia floated safely, but when the ocean became stormy then this layer was broken into pieces and was driven back and forth on the restless waves without any organization, sense, or ability to do anything.

I often make a comparison of Russia to a wealthy house where lives a large family. The house is attacked by burglars and the head of the house is killed. What can the housewife and the small children do against these burglars when they have no means of defending themselves, and the natural protector is dead? And would you think of saying that the children approve the work of the burglars? No.

Russia Waiting to be Helped

In the same way the Russian people,—when even the delegates of the Russian peasants to the Constitutional Assembly were driven out at the point of the bayonet by the Bolsheviki—the Russian people went back to their homes to await events.

From the outside it seems as if the Bolsheviki are ruling Russia with the silent consent of the Russian people, but the Bolsheviki acquired control of Russia in the same manner in which a small boy with a whip in his hands acquires control of a large bull with a ring in its nose.

And now what to do for Russia? There is only one answer. Help her. And this help must be provided from two points of view, from the practical and the idealistic. It is quite clear to everybody who knows the Russian resources and the German ability to penetrate into a country, that so long as the allies permit Germany to stand with one foot on the Russian border, the allies' victories on the western front will not be complete.

Mankind should be thankful to Russia for what has happened right now, because at Russia's expense and suffering, has been made on a very large scale an experiment in socialism which has proved the extreme danger of introducing socialism under unfavable conditions.

FUEL CONSERVATION BY PRIORITY REGULATION

BY MAJOR GEO. F. SEVER

(The basis of priority classification for the purpose of conserving fuel—and for further government action in the power situation. Something of the survey which the government has been making on the Pacific Coast by the representative of the War Industries Board in this matter. The paper is one of the "Fuel Conservation" symposium of the recent joint engineering meeting on that subject.—The Editor.)

The Relation of Power and Fuel —

My mission to this coast is to make careful studies of the electric power situation, to learn if there are any industries which might be classed as war industries, war essentials or public necessities which are suffering from lack of electric power for turning out their product or for conducting the usual and normal affairs of a community. The study also includes the determination of how much, if any, power is being employed in the operations of non-war essentials. In some places there might be found a large percentage of the latter class, the elimination of some of which will in various ways tend to conserve fuel, whether in the form of coal, gas or water, through the reduction of the electric power used by them.

The Necessary Power Program —

Our investigations are arranged to determine the power capacity of the different systems, the building program and the financial ability of the power company to carry out its contemplated projects if deemed wise and necessary for the purposes of supplying any real needs during the war period. Against the capacity of the system and the recommended needs, a study is made to determine the load on the maximum peak-load day, how much has been added since that date, and what the predictions as to increased load during the next few years may be. These items, when added together and employing a suitable deversity multiplier, will give the estimated loads which will have to be met by the present capacity of the system plus the proposed increases.

The difference between the estimated loads and the capacity will indicate approximately what will be necessary in the building program. The matter of reserve capacity is quite a different question in war times from that in peace times, for there is not warrant for holding in reserve as much expensive equipment in war times as in peace time, and the operating force must be made to realize that more care shall be exercised to secure full service with less equipment. If there are found any limiting features, such as lack of engine capacity, generators, boilers, stokers, stacks, transmission lines, water wheels, flumes, ditches, penstocks or storage reservoirs, steps are taken when warranted, to seek to improve these conditions by urging the power company to arrange to finance these necessary improvements in order to prevent the important industries from being compelled to curtail their output, and it may be, having these operations conducted in other places where ample power and facility are available. In many instances a large shortage of power supply has been found and embargoes have been placed against these, to the end that no further Government contracts could be secured.

The Classification —

In the study of the industrial establishments in any center supplied by a power company, certain operations are classed as war industries, these being direct contracts with some Government department, such as the War or Navy Departments, or the Emergency Fleet Corporation, the Aircraft Division, the Signal Corps, or some one of the many divisions authorized to place direct war contracts. Then there are other industries not directly under Government contract but engaged in operations which supply material for the conduct of the war. These may go into the manufacture or construction of articles very necessary in assisting towards the winning of the war, and must require electric power for this production. These are called war essentials.

A third class covers public necessities essential in the life of the country's communities, and electric power thus employed enters into illumination of the streets, homes, buildings, elevators, street cars, and many other uses which will appeal to you all. A certain curtailment in many uses in this class can be made without serious inconvenience, but in some places serious curtailment has had to be enforced.

Under the head of non-essential industries curtailment in the use of electric power and the consequent saving of fuel can be accomplished. This requires much experience and care in its enforcement, and can be done either by individual elimination or by treating the reduction through classes of service.

On this coast the industries using electric power can be classified, but only incompletely, under the following headings:

War Industries	War Essentials	Public Necessities
Sugar refineries	Irrigation—Feed	Waterworks
Oil refineries	Reclamation	Bakeries
Chemical and powder works	Flour and grain mills	Ice cream
Ship building	Packing houses	Cement—part
Iron works—steel	Cold storage & ice	Lumber mills
Can factories	Tanneries	Mining—part
U. S. Government work	Wire works	Gold dredging—part
Aircraft	Farm implements	Electric railways
Cantonments	Ferro-alloys	Laundries
Fire arms manufacture	Foods	Newspapers
Coke	Fertilizer works	Printing—part
Toluol		Elevators—part
Explosives		Streets—part
U. S. railroads		Signs—part
		Theatres—moving Pictures—part
		Clothing
		Creameries
		Garages—part
		Schools

Every step should be taken to conserve the use of electric power and no new industry or operation should be started which calls for the use of electricity, unless it is one which has a direct Government contract or one calling for the providing of a war essential. Every one should strive to conserve raw materials and manpower, in that no unnecessary use of these should consume electric power which reflects back on the oil reserve, coal pile or water storage.

DOES INTERCONNECTION GO FAR ENOUGH?

BY H. G. BUTLER

(The interconnection of power plants is the mere form—the true value for fuel conservation comes in the consolidation of power plant interests. A consideration of government and private ownership with a forecast of after-the-war problems. One of the important papers of the recent joint meeting on Fuel Conservation at San Francisco—by the California State Power Director. —The Editor.)

Why Curtailment is Necessary —

The fact that it was necessary more or less arbitrarily to require the people of the United States to curtail their consumption of various commodities indicates that the industrial affairs of the country should be examined, the reasons why we were short of fuel, food, power, etc. discovered, and corrections applied to any conditions which have proved to be faulty.

Developments Elsewhere —

During the war the Government is eliminating all the more conspicuous forms of waste, and it will assuredly be necessary to continue this policy after the war if we are to compete successfully with the industries of Europe, all of which have been speeded up for war production in such a way that the speed can be maintained after peace comes. In France, to cite only one instance, 180,500 horsepower has been installed since 1914 on three rivers of the Alps. The magnitude of this development can be appreciated when it is understood that it would carry about 50 per cent of the peak load of all the power plants in the State of California north of Merced.

Production all hinges on power; power reduced to its simplest terms means one of two things,—fuel or water. The first step in the program of this country, beyond all question, should be to harness the streams. The second should be the elimination of all waste of fuel.

We have lately seen a move all over the world

to interconnect independent power plants in the same locality, and interconnection has been touted as a panacea for many of the ills the electrical industry is heir to. As a matter of fact the advantages derived from interconnection result not from interconnection but from the uses that are made of interconnection. Interconnections mean nothing unless the power flows through them. Financial, legal and technical difficulties are not solved by them, and until these difficulties are surmounted the most economical use of fuel will not be made. Without something more than interconnection each company will continue to look after its own interests and the interconnections will be used only in those cases where both companies can mutually share the benefit.

What Interconnection Has Accomplished —

The fact that interconnections are being made throughout the United States and other countries indicates that the mutual savings of the interconnected companies are great; obviously they would be much greater if the diverse interests of each company were harmonized and the entire situation in any given territory were handled as a unit. For a supply of 500,000 kilowatts for war industries in the East it has been estimated that isolated plants, in comparison with central stations, require for installation twice the investment and for operation four times the coal, four times as many coal cars with their complement of locomotives, track and terminal facilities, and four times the man-power. Again, it has been estimated that if the whole of England were linked up with central stations located at economical points near the coal supplies 50,000,000 tons of coal per annum would be saved.

It is not necessary, however, to go to England to secure an illustration of what interconnection means. In the San Joaquin Valley and in Southern California the San Joaquin Light and Power Company and the Southern California Edison Company are interconnected. The maximum load of the former company, which is mainly due to pumping, occurs in the summer, while the peak load of the latter comes in November. Through the interconnection the San Joaquin Company is able to carry a considerable part of the Edison Company's load in the winter while that company can reciprocate in the summer. By this method of operation the use of fuel is greatly reduced and the full benefit of the water tributary to the hydro-electric plants is secured.

Another instance, in northern California, is the case of the two companies one of which has a large installed generating capacity, a large forebay and unlimited conduit capacity from reservoir to forebay, while plants of the other depend upon natural stream flow or limited conduit capacity and are without forebays sufficient for regulation. With interconnection between these two utilities, at certain stages of the streams, the water power plant of the first company can reduce its output and store water in its large forebay during the hours of light load when the plants of the second, with less regulating capacity, are sufficient, and then increase its output during the peak load on the two systems; if the interconnection were absent the second company would be obliged to burn fuel for steam power to carry it over its peaks.

What Consolidation Would Do —

It is impracticable to attempt to show the actual savings which could be made in fuel by either interconnection or consolidation, because there are many unknown factors which enter into consideration in each case and which vary from day to day. Broadly speaking, consolidation would conserve fuel in five ways:

(1) It would improve the yearly load factor and the daily load factor because of the greater diversity of load, thus increasing the efficiency of the steam plants; instances of which are the consolidation or interconnection of two companies, one having a large lighting load in the winter and the other a large irrigation load in the summer, or of two companies, one having an industrial load and the other a street railroad load.

(2) In the case of companies having both water and steam power plants, the combined operation of water power plants of different physical characteristics, as for instance a plant with natural stream flow but without storage and a plant with a large forebay, would permit the carrying of peak loads by water power which, without combination, would necessarily be handled to a large extent by steam by the company having the natural stream flow developments.

(3) It would permit the load to be blocked out to the more efficient steam plants, so the less efficient plants would operate only on the peaks or would shut down if the combination had excess generating capacity.

(4) In making extensions the combined companies would install larger and more efficient units than the several constituent companies, if each company should make its own extension. In the larger plant higher class boiler room supervision results in fuel economies.

(5) Under consolidation existing plants would be enlarged and new plants would be built in locations better adapted to handle the consolidated load, thereby saving fuel through reduced line losses.

As a by-product of consolidation, the loads which could be safely allotted to a certain generating equipment are materially increased and it would be feasible to apply to regular service a large portion of that generating capacity of the companies which would otherwise be held in reserve, because the interconnected transmission lines would make the reserve capacity of any one division available for the whole consolidated system.

Compared with Interconnection —

In several of these five instances it is possible that the mutual benefit to the interconnected companies would lead them to operate their plants to effect these economies; but in many cases commercial, legal and other reasons would interpose objections to the use of the plants in this manner, except to a limited extent. In the last two cases the economies would be effected only by consolidation, and the interconnection would be only a result of consolidation.

The economies effected in the use of fuel are only one phase of the whole question of consolidation. Consolidation results in saving man-power, in conserving capital and in reducing operating expenses; but perhaps after all the greatest gain from consolidation would be found in the fact that under consolidation the problems which arise in the territory of the consolidated companies would be approached and solved with a mind single to giving the best service for the least cost.

Government or Private Consolidation —

Congress now has under consideration the passage of a bill permitting the President to take over the power plants of the country during the duration of the war. But it does not necessarily follow that electric consolidations mean government or state ownership. Until the means of transmission shall have been improved the problems of the electrical utilities in each locality must be solved locally, and in no section of the country is the industry of such magnitude that it cannot be organized and managed by private capital; a condition which of course is not true of the railroads.

A Partnership Possibility —

So many of the motives which urge men to put forth the best that is in them are lost under government ownership that it should be resorted to only after everything else has been tried and has failed. Some way surely can be found to secure the benefits both of consolidation and of private enterprise. A great many of the difficulties in which the utilities are now involved have been occasioned because the Government and the utilities have never come together except to get in each other's way. The only railroad policy of the Federal Government, for instance, has been one of repression. Possibly the ultimate solution of the matter will be found in some partnership arrangement whereby the state or nation will do more than regulate but less than own and operate the electric utilities. The tendency of the future undoubtedly will be toward consolidation—Great Britain is now urging even its manufacturers to consolidate their plants and interests to prepare for after-the-war business—and if private capital working in close cooperation with the Government does not bring it about, State or Government ownership eventually will.

Conserving Brain Power as Well —

We think we are meeting and deciding tremendous questions at the present time, and so we are. Problems after the war, however, will be no less in magnitude and the necessity of their proper solution will be much more vital than it is today because they will then have to be decided upon a permanent basis. We shall need all the brains and all the ability of those engaged in public utility management properly to solve these future problems and the nation cannot afford to permit them to dissipate their energies in competing with one another.

It may be found that the conservation of this brain power and energy by consolidation will be far more valuable than the conservation of fuel, important as that undoubtedly is.

THE WAR- AND AFTER-THE-WAR VALUE OF FUEL OIL

BY DAVID M. FOLSOM

(What are we going to do when our ships need fuel oil? A survey of present conditions and the demands of the future which point the way to waterpower development and general electrification.—One of the "Fuel Conservation" papers of the recent engineering gathering in San Francisco. The author is Fuel Oil Administrator for the Pacific Coast.—The Editor.)

No one can measure with any degree of accuracy the quantity of oil under ground and no oil company can ever hope to secure in storage above ground more than a few months' supply of crude oil or any petroleum product. A change in the demand for refined products or a change in the production of crude oil is immediately reflected in the entire industry. Any attempt to predict the future is therefore rash, but in spite of this I wish to try to point out in a broad way the future requirements of oil on the Pacific and particularly to emphasize the dependency of Pacific industry and commerce upon oil.

After the War—Commerce

If the United States is to meet successfully the industrial and political problems which will arise after the war it must be done through increased domestic development and through the expansion of our foreign commerce.

To the expansion of commerce we are already committed through the construction of the merchant fleet under the United States Shipping Board. In 1914 the total merchant fleet of the world was, in round numbers, 50 million tons. A part of this has been destroyed by submarines and raiders but by 1921 there will be under the American flag and under the direction of a single organization 25 million tons of new ships. These ships must have some place to go and they must have something to carry. A great part of this fleet will undoubtedly operate on the Pacific and every port and every industrial section of the Pacific must feel the impulse and the stimulus of increased trade.

Oil for Ships —

If this is to be done I believe that every boat that operates successfully on the Pacific under the American flag must be an oil burner and that eventually these boats will be equipped with internal combustion Diesel engines. There are two reasons for this. In the first place, the coaling stations of the world are under the control of either the English or Japanese nations and more important than this is the fact that only through the use of oil can America meet the cost of competition under the handicap of the high wages which this country pays its seamen.

Oil is a natural fuel for ships: compared with coal, cheaper and easier to handle, and more efficient in use it gives a longer steaming radius to vessels. The amount of oil required to supply our new boats will tax our resources to the utmost. At present we are not producing in this country enough oil to meet our own domestic requirements and the present estimates of the Shipping Board call for an additional 80 million barrels or 25% of the present production for the support of the new merchant fleet.

This can only mean one thing—a smaller quantity of oil used on land. It is inconceivable to us as

Americans that our fleet will not be a success and that we be unable to compete successfully in the commerce of the world, but we can only provide oil for this fleet by conservation and substituting other fuel or power on land for the fuel oil we are now consuming.

Conservation Not Necessarily Curtailment —

On the Pacific Coast this presents an acute problem worthy of the best talent in the engineering profession. Oil is our best fuel, and California oil supplies two-thirds of the power, light and heat over the western third of the United States.

If we are to expand our own trade and develop products to supply cargoes for our ships, we must have power, we must have fuel for factories, mines and farms. In face of the necessity for decreased use of oil, where is the Pacific Coast to get this power? I believe there is no single solution but instead a joint solution to this problem. Oil must be used more efficiently both on land and on ships through the development and increased use of the internal combustion engines, and on land hydro-electric power must be developed and used on a greater scale than ever before.

Intelligent conservation means efficiency in the use of our fuel—not curtailment that cripples industry. Intelligent conservation also requires development of natural resources now unutilized. Regardless of the cost in money, regardless of the labor involved, regardless of the machinery, and quantity of copper wire required, the streams of the Pacific Slope must be made productive of power and generated energy transmitted over a completely interconnected network of transmission lines.

This problem brings an opportunity to engineers—more than an opportunity—it brings an obligation to each society of engineers and each individual—an obligation to those of us who have stayed at home to get out of the technical groove and to use imagination, to use initiative, to think in terms of the future and in terms of international growth, and to use our energy as a pioneer regiment in the service of our own nation.

THE WATER POWER SITUATION IN CALIFORNIA

BY P. M. DOWNING

(Herein the operating engineer of the vast system of interconnection in Central California gives interesting and timely information on the power situation. The article is abstracted from a recent paper delivered before the San Francisco branch of the A. S. M. E.—The Editor.)

Water power development in this state has been about equally divided between the northern and southern portions. The rate of development in both places has been rapid. In 1900 the aggregate installed capacity of all the plants in the northern part of the state was approximately 15,000 kw. In 18 years this has increased to over 375,000 kw., or at the rate of over 20,000 kw. per year. In addition to this there is also installed steam generating plants having an aggregate capacity of approximately 187,500 kw., and yet with all this development California is today facing one of the most serious power shortages in its history. In 1917 the five large power companies in the northern part of the state generated 1,507,000,000 kw-hrs. 239,000,000 kw-hrs. or approximately 16% of this was produced on steam, requiring 1,195,000 bbls. of oil. The peak load during the year was 265,000 kw.

The load, both energy and peak demand, is increasing at the rate of 10% per year. To meet this increase there will have to be provided each year additional facilities, having an energy producing capacity of not less than 150,000,000 kw-hrs. and a peak capacity of not less than 26,500 kw-hrs.

The winter of 1917-18 was one of abnormally low precipitation. Without the usual late storms during the spring of this year, the stream flows during the past few months have established new minimums, never known before. The steam plants which heretofore have always been considered as reserves to be used only in emergencies, have been called upon to operate up to their maximum capacity throughout the entire twenty-four hours of the day. During the past few months approximately 40% of the energy supplied in the northern part of the state has been produced on steam, 40% from stored water, and 20% from natural stream flows.

The oil consumption for steam generation in the northern portion of the state for the year will amount to over 2,000,000 bbls.

Owing to the unprecedented low stream flows, it has been necessary to materially curtail the power usage of a number of less essential industries. The storms of the past week or ten days have improved the water conditions somewhat, and were sufficient to avert a more serious shortage. With normal weather conditions there should be no further serious shortage this year. Heavy orchard irrigation is about over with, and rice irrigation will soon begin to drop off, so that we are reasonably safe in saying that the crisis for the year has passed.

A forecast of the future, however, is not so bright. The only additional energy that will be available other than that due to a more nearly normal season, is 60,000,000 kw-hrs. from the systems of the California-Oregon Power Company and the Northern California Power Company, and an additional 75,000,000 to 100,000,000 kw-hrs. from the increased steam plants of the Pacific Gas & Electric Company. On the basis of an annual increase in load amounting to 150,000,000 kw-hrs., this additional energy, even with normal water conditions, will barely be sufficient to carry the load through the year 1919.

Unless other facilities are obtainable by 1920 there will be a more serious shortage beginning with that year, which will be cumulative until other facilities are provided. No new hydro developments are under way at the present time, and in view of the scarcity of labor and material no new installation of any size can be made in less than two years. Without additional hydro to relieve the situation, there will be required for steam generation by 1920, between 3,000,000 and 3,500,000 bbls. of fuel oil; an increase of between 500,000 and 700,000 bbls. per year.

SPARKS—Current Facts, Figures and Fancy

(Here's more war economy—a seatless car, a rivetless ship, an usherless theater, a noiseless alarm. They are doing surprising things with electricity, from guiding aeroplanes by an illuminated cross on the Swiss plateau, to driving cattle with an electric prodding stick on the western cow-puncher's ranch.—The Editor.)

According to the Times, a Swiss Federal Cross, lighted with electricity and over fifty yards in dimension, has been installed on a plateau near the Franco-Swiss-German borders for the guidance of belligerent aeroplanes.

* * *

Some of the inconveniences of traveling at night may be banished by installing a small battery in your suitcase, connected with a light in each end. Cells of the battery may be placed under each end of the hand-grip and a push button extended through the leather near the handle. A push on the button, and your way is lighted before you.

* * *

The rivetless steel vessel has successfully completed her maiden voyage with a full cargo, and in rough weather, according to press reports from London. The English welded vessel is 125 feet long, has a 16-foot beam, with displacement of 275 tons. More than 240 hours were saved in construction and an economy of more than 1,000 pounds of metal was effected by the absence of rivets.

* * *

On some of its routes the Rome (Italy) tramways are experimenting with a number of seatless motor and trailer single-truck cars. They are of the enclosed type with bowed ends, and accommodate as many as sixty-five passengers on their front and rear platforms, and in the outer two of the three parallel longitudinal aisles. The central aisle, marked off by a series of hand rails, is kept free for fare collection and passenger circulation.

* * *

A silent alarm wrist watch has been invented which is designed to wake a sleeper without disturbing his neighbors. A miniature battery is worn on the wrist with a small switch lever inserted in a space beneath the watch crystal opposite the predetermined hour. When the hour hand reaches the proper point, it closes the switch, and a current-heated wire about the wrist scorches the sleeper until he awakens and opens the switch again. This wrist watch should prove invaluable at the battle front as well as in the boarding house.

* * *

A curious new mechanism called the "vacant seat detector" bids fair to banish the usher from moving picture theaters. On entering a theater you are confronted with a large seating diagram, with shuttered perforations, illuminated from behind, to indicate the seats. The shutters of vacant seats are open, letting the light show through, but when you choose your seat and sit down in it, the shutters close and that seat perforation is dark. The shutter is revolved through the influence of an electromagnet connected with the corresponding seat.

* * *

Interconnection has reached Germany. Representatives of all electric central stations met recently in Wurtemburg, Germany, for the purpose of uniting under a single management. A similar organization of the Hungarian central stations has been legislated by the Hungarian Parliament. Lines will be laid interconnecting the various power houses, and arrangements will be made for the most effective and economical production and distribution of the energy generated.

* * *

Ranchmen have become so at home with electric power that they have harnessed some of it for prodding stubborn cattle into the dipping-vat or the branding-pen. The men carry wooden rods, with a pushbutton in the handle connected with a small shocking coil and four dry cells, also in the handle. The "business end" of the rod is solid except for a single hole through which a wire runs to connect one terminal of the coil with the metal tip of the rod. When the push button is pressed, the batteries discharge into the shocking coil and the herd is started on its way.

* * *

The old Austrian ship "Lucia," taken over by the United States upon the declaration of war, has just been equipped with the so-called buoyancy boxes of the Shipping Board to render her unsinkable. These independent watertight flotation boxes or tanks, three feet by two feet by one foot, are stored between the frames and deck beams, against the bulkheads and in the unused cargo space. The distribution of the buoyancy boxes is such as to render the "Lucia" stable under all conditions of flooding, and yet her cargo carrying capacity, with goods of average specific gravity, has not been curtailed.

* * *

Switzerland is drying her fruit by electricity. The Bulletin of the Swiss Association of Electricians describes government experiments which showed that electric evaporation apparatus could compete with those using coal only when the price of energy did not exceed three to four centimes per kw-hr. The period of "high water" in 1917 increased the hydro-electric companies' energy to such an extent that a considerable surplus was available during the night at the price named. Some companies have agreed to supply the current at a lower price, for patriotic motives, and in one region the energy is supplied during the night gratuitously.

THE VACUUM CLEANER —— THE VACUUM CLEANER

A novel is more interesting than a book on mathematics, if we are to judge by the number of its readers. It is just the conversations and spicy bits of plot which go to make up the advantage of the novel which ordinarily find their way into dusty corners of a technical publication and eventually into the office waste basket. With the idea of salvaging some of this material for the benefit of the readers of the Journal of Electricity, this page has been given over to the particular care of the office Vacuum Cleaner.—The Editor.

This is not a laundry mark but the Journal of Electricity in Japanese. Coming across these sentiments on the trackless pages of a Japanese magazine, the Journal of Electricity is aware that it is quoted. Incidentally, all Japanese publications begin at the back instead of the front and run in vertical columns which are read from right to left. Tables are run in Arabic numerals tilted the wrong way of the page from an occidental standpoint and often form the only point of identification even to the author of the paper reprinted. Japan is much interested in the electrical development of the Pacific Coast as is to be judged from the numerous quotations from the Journal of Electricity appearing in such publications as Denkinotomo (The Electrician's Friend). That this is no passing interest is to be judged from a letter appearing in the Journal of Electricity for Jan., 1896, from I. Fujioka, chief engineer of the Tokyo Electric Light Company, in which he expresses appreciation of the worth of the publication. Mr. Fujioka's company is still represented as a subscriber. The presence of such men as Mr. Geary and Mr. Swope in Japan and the numerous Japanese engineers and electrical men on trips of inspection in this country should serve to bring the interests and the point of view of the West and the East together, an end for which the Journal of Electricity has constantly striven.

（電氣之友　大正七年六月十五日　第四四九號）

Not only the men of the electrical industry, but their children as well, have caught the poetical influenza. Here is a plea for the Fourth Liberty Loan written by the little eleven-year-old daughter of one of our readers:

Over the seas flew the money bags,
Away, oh, ever so far
To the lonely children of France in rags
To keep away Kultur's scar.

People are getting more honest. At least it would be unnecessary today to write such an editorial as that which appeared some twenty odd years ago in the Journal of Electricity's earlier days. The "moral disadvantage" of street car transfers is there pointed out as leading inevitably to fraud and crime. At that time, apparently, the transfer systems had just been introduced in the West and it was reported to be common practice to "hand transfers to newsboys who use them as premiums to aid in the sale of their papers. This is nothing more nor less than theft." The convenience of the transfer to the traveling public is not questioned but its success is gravely questioned in the light of the shameful lack of moral sense possessed by the patrons of the roads.

Calling Bernard Shaw a "national ass" in place of a "national asset," as happened recently in a New York paper, was a typographical error which brought rather embarrassing results. The difficulties with the water systems of San Francisco and Los Angeles which occur on page 343 of this issue are more obviously unintentional and it is to be hoped will lead to no libel suits. The passage should read:

The greatest daring in municipal water-supply — the Los Angeles Aqueduct and the Hetch-Hetchy—grace the triumphs in engineering in the West. The former has already been completed and conducts water from the high Sierras through mountains and deserts a distance of 240 miles to the south, while the latter is to bring water from the Hetch-Hetchy Valley in the Yosemite National Park to San Francisco by tunnels and pipes from the Sierra through the Coast Range, a distance of 180 miles. Vast water powers developed en route are proving and will prove of great engineering and financial value to these municipal projects.

PIPES usually have a man attached to one end of them—but ordinarily they are not this kind of pipe. This unusual picture of one of a power plant manager was taken by I. W. Alexander by pointing his camera down a section of pipe in the oil fields. Young "Ike" has promised to focus his camera on several other power plant operators for the further benefit of the Journal of Electricity. Only this time there will be no pipes about it, the operators being women who have recently entered the service of the San Joaquin Light and Power Corporation in that capacity. Women are also being used as readers and in technical and semi-technical work. The interesting article on this new factor in the electrical industry is scheduled to appear in an early issue.

The Beasts of the Electrical Jungle are further represented by this gentle creature whose inner temper belies its looks. But however much it may be associated with hot water, it is to be remembered that it is easily regulated.

THE PERCOLATOR

Hear the purring percolator
With her warm and kindly natur'—
And yet she
Can get hot as any crater—
Children, do not imitate her,
Calmer be.

THE VACUUM CLEANER —— THE VACUUM CLEANER

PERSONALS

Dr. B. M. Woods, assistant professor of theoretical mechanics at the University of California, has in recent months been rendering splendid service as president of the Academic Board having in charge the School of Military Aeronautics at Berkeley, where is located one of the five great national ground training schools for the aviation service. Announcement has just been made by President Wheeler that Dr. Woods is to be the administration officer also for the new thirteen weeks' course for radio electricians which the government is establishing at the University of California. The total enrollment of this school will be three hundred men, admission to take place in groups of one hundred monthly. Dr. Woods is well known to men of the electrical industry in the San Francisco Bay district as he gave a most interesting talk on aeronautics before the San Francisco Electrical Development League last spring.

W. G. Kerckhoff, president of the San Joaquin Light and Power Company, spent some time in San Francisco recently.

E. Armstrong, prominent in electrical affairs in Indianapolis, has been a visitor in San Francisco during the last two weeks.

J. E. Woodbridge, chief engineer of the Sierra & San Francisco Power Company, has returned to San Francisco from a visit to Seattle.

W. E. Jones, Pacific Coast salesmanager of the Economy Fuse Company, with headquarters at Seattle, Wash., is a recent San Francisco visitor.

D. M. Smith, Pacific Coast representative of the Plume & Atwood Manufacturing Company, is making an extended trip through the Northwest.

Lee Hagood, representative of the General Electric Company at Petrograd, passed through San Francisco recently on his return to Schenectady from Russia.

G. B. McLean, of the Southern California Edison Company, and **Ralph B. Clapp,** manufacturers' agent at Los Angeles, have been appointed secretaries of the Y. M. C. A. for overseas duty.

R. Q. Cleavenger, of the Phoenix Glass Company, Pittsburg, was a recent Pacific Coast visitor. He reports business as unusually good in his line but better still, Cleavenger Junior, who is ten months old, is the finest-ever.

William H. Ingersoll has recently been appointed director of four-minute men. He was trained as an electrical engineer, although his energies have largely been devoted to the fields of sales management and advertising.

W. J. Duffy has been appointed accountant at the Eureka, California, division of the Western States Gas & Electric Company, succeeding **N. A. MacMillan** who has accepted a position as cashier in one of Eureka's largest banks.

C. M. Brewer, manager of the Richmond, Cal., division of the Western States Gas & Electric Company, was Chief Registrar in the recent draft registration and the local office of the Western States Company was used as a registration place.

M. J. Gavin, assistant refinery engineer of the U. S. Bureau of Mines, with headquarters in San Francisco, has recently returned to San Francisco from an inspection of shale oil distillation plants in various parts of the United States.

Carl Heise, San Francisco manager of the Westinghouse Electric & Manufacturing Company, has returned again to the Pacific Coast headquarters in San Francisco after a most enjoyable and profitable business trip East covering several weeks.

A. W. Childs, superintendent of sales for the Southern California Edison Company, has been elected a member of the advisory committee of the California Cooperative Electrical Campaign, to fill the vacancy left by the resignation of G. B. McLean.

W. A. Marsden, who has for several years been connected with the sales department of the Pacific States Electric Company at Seattle, has resigned his position with the company and entered the employ of the A. H. Cox Company as electrical engineer.

C. E. Persons of San Francisco has been appointed by Fuel Administrator Garfield as director of education of the fuel administration. Persons has been connected with the western division of the Associated Press for seven years and for three years has been news editor of that division.

E. J. Mehren, vice-president and editorial director of the McGraw-Hill Company, Inc., of New York City, is a recent visitor at practically all of the larger Pacific Coast cities. In addition to his executive position with his company, Mr. Mehren is also editor of the Engineering News-Record.

George W. Halliday, who enlisted five months ago as a private, has been commissioned second lieutenant and placed as assistant to the officer in charge of utilities at Camp Fremont. Lieutenant Halliday now directs the water, electricity, gas, sewers and roads arrangements for this important concentration point.

Elmer Dover, vice-president of H. M. Byllesby & Company in charge of the Northwest Pacific Coast properties, has been elected chairman for Pierce county of the committee in charge of the United War Work campaign for the state of Washington. This committee will conduct a campaign during the week of November 11th for the raising of funds for the war work of the Y. M. C. A., Y. W. C. A., Jewish Relief, Knights of Columbus, camp libraries, and war work community service.

Leon B. Jones, assistant chief engineer of the gas department of the Pacific Gas & Electric Company, has enlisted as a private in the Engineer Corps of the United States Army. Mr. Jones is the second son of E. C. Jones, chief engineer of the gas department. He has contributed brilliant work in gas engineering, having been the originator of oxy-acetylene welding of steel gas mains. He has devoted much time and thought recently to the extraction of toluol from manufactured gas. While Mr. Jones patriotically starts in as a private in the service those who know of his brilliant work of the past have every reason to believe his valuable services will not be long without recognition. In fact, as these forms go to press a telegram advises us that Mr. Jones has just been appointed to report at the engineer officers' training camp at Camp Humphreys, Va.

Captain Ralph DeP. Clarke, formerly in the sales department of railway equipment of the General Electric Company in San Francisco, is now busily engaged in national service abroad. Mr. Clarke at the Panama-Pacific International Exposition had charge of the transportation exhibit for his company. Having had experience in the National Guard of New York and upon the Mexican border, he was admitted to the first officers' training camp at Plattsburg, New York, where he won his position as captain. Now in the tank service abroad, he writes most interestingly to A. V. Thompson, of the General Electric Company, San Francisco, and a former close associate, as follows:

"Dear Tommy: I have just been reading your long, interesting and very welcome letter of Aug. 7th, which caught up with me today, and amid mighty interesting surroundings as you will see. By the light of a candle in the cutest little dugout you ever heard of. I wish I could say where we are, but you will have to try to imagine. It is on ground several times fought over and won back again from the Boche within the past month—and with all the consequent wreckage and litter. Personally I am really very comfortable for the time we stay here, for Fritz had an eye to that for himself when he built. It is really a tiny house (just 8x6 ft.) set in the ground and the roof covered with dirt. Wooden floor, table, bench and shelves, my own burlap rug—all as snug as could be desired when it doesn't rain too hard. I am really very well off.

"We have not been in action yet, but I have lost two fine men killed and one wounded. Our turn comes soon, and we are looking forward to it. For the present we sit here waiting while the artillery keeps things stirred up in front of us and every once in a while all lights are put out and we duck down while Jerry flies overhead. He very rudely disturbed us about 2:30 this morning, but did no damage. I am proud of my company as a man can be, and know they will give a good account of themselves. Unfortunately, as a company commander I cannot just go over the top in one tank and smash the Boche but must direct the activities of a lot—but that is my job and it is up to me to do the best I can by it.

"I can assure you we appreciate very deeply that every one at home is solidly behind us, and it means a lot, too. There is no glamor about war, seen close up, but it is fascinating and we have a big job; we have got to go hard—I wouldn't miss being right where I am for anything.

"On your 2 to 1 proposition of killing Huns I take issue—it is too extravagant a ratio. Our Corps has an average in the British Army of about 21 to 1, and we want to make it 50 to 1 or better. I am getting to know the British thoroughly—besides our time in England I have lived with, slept with and eaten with them, and soon will fight with them. This war does tend to a great mingling of the races that ought to do the world a lot of good.

"Today I had an interesting visit—one of the other captains and I managed to get permission and a car for a semi-official trip, and in the course of it looked in on our old outfits—the first American troops outside of our own we have visited in nearly six months. Coming back we tried to take a short cut to get in before dark—and went through the worst shell-torn country I ever heard of—it beggars description. Strange to say, our decrepit Studebaker, which had given trouble all the way, leaped from crater to crater like a goat and brought us in with only one tire change.

"There are a number of California men among the officers, and we often talk about it until the others are weary. I certainly hope that some time after this present job is all finished I can at least spend some time there. My friends and associations on the Coast mean a great deal to me and I want to keep in touch."

Robert E. Bond has been appointed secretary of the Baker-Joslyn Company with headquarters in San Francisco. Mr. Bond is also president of the Island Electric Company, Ltd., Wailuku, Maui, T. H. This installation is a small but successfully operated Diesel engine electric generating plant in the Hawaiian Islands.

F. W. Mahl comes from New York to San Francisco as the corporate mechanical engineer for the Southern Pacific lines under federal administration. He has for many years in New York been director of purchases and prior to that time had a long and varied experience in the direction of mechanical departments of the company.

A. S. Kalenborn, formerly chief engineer of the San Joaquin Light & Power Corporation but now electrical engineer and general superintendent of power for the Cerro de Pasco Copper Corporation at Oroya, Peru, is busily engaged in helping to get out the 6,000,000 lbs. of copper per month for the Allies that is being mined by hydroelectric power by this great company in South America.

R. Boan, engineer of tests, **E. W. Arthur,** assistant manager, and **F. J. Shea** of the mechanical branch of the Victoria Government Railways of Melbourne, Australia, are recent San Francisco visitors. They are making a tour of the United States to get in touch with American railway practice in the interests of Australian railways and have just now arrived on the Pacific Coast en route east.

Gerard Swope, vice-president of the Western Electric Company, who it will be recalled, as announced in the Journal of Electricity Feb. 1, 1918, was recently awarded the Fourth Order of Merit, with the Minor Cordon of the Rising Sun, by the Emperor of Japan in appreciation of services rendered toward the advance of the electrical industry in Japan, has now been called into the service of his country. Mr. Swope has been inducted into service by the War Department to assist in the Purchase, Storage and Traffic Division of the General Staff.

Professor C. E. Magnusson, of the University of Washington, has sent to Washington a plan of water power development which is attracting a great deal of attention. It proposes to apply the principle of government owned and operated main ditches in national irrigation systems to the utilization and unification of natural hydro-electric resources. The central basis of the plan is a trunk transmission line extending from the Canadian border to the Columbia river, a distance of about 260 miles. Senator Poindexter of Washington commends the plan very highly.

Theo. F. Dredge, Pacific Coast representative of the Pittsburgh Piping and Equipment Company, has done some good work for the Twelfth Liberty Loan District. In response to calls for subscriptions to this loan Mr. Dredge sent the following telegram:

Pittsburgh Piping & Equipment Co.,
25th & Smallman Sts., Pittsburg, Pa.

Fourth Liberty Loan Local Committee desires me to secure an allotment of your subscription for this district. Please wire me without delay what amount I may subscribe in your name so that I may be able to report promptly. Even the dogs may lick the crumbs from the Master's table.

(Signed) THEO. F. DREDGE.

This brought a response of $2500 from the Pittsburgh Piping and Equipment Company. Later by a similar plea he secured a subscription of $2000 from the Richardson Phoenix Company of which also he is the representative.

OBITUARY

William Kent, the author of Kent's Mechanical Engineer's Hand Book, died on Sept. 18th at his summer home at Gananoque, Ontario, at the age of sixty-eight years.

MEETING NOTICES FOR ELECTRICAL MEN

(The Oregon Convention of Contractors and Dealers brings out much that is helpful in merchandising suggestions. The San Francisco Development League appoints committees for the new year. An inter-company convention emphasizes the needs for war-time conservation.—The Editor.)

The Oregon Association of Electrical Contractors and Dealers

The meeting of the Oregon Association of Electrical Contractors and Dealers held in Portland, September 20th and 21st, 1918, provided an interesting program for its members.

Following a joint meeting of the Executive Committee of the state and local associations in the afternoon, a dinner and general business meeting was held at the Multnomah Hotel, Friday evening.

Committee reports were submitted as follows:

Mr. Jaggar, as delegate to the recent meeting of the British Columbia Association of Electrical Contractors and Dealers, held in Vancouver, B. C., gave a glowing account of his trip and the activities of the British Columbia Association.

Mr. Scott reported the result of his investigation of the question of cost and data sheets for universal price sheets.

Mr. Kenney submitted an interesting statement of the present labor situation.

Mr. Pierce reported on house wiring conditions.

Mr. Paul reported progress of the Publicity Committee and urged greater activity on the part of members in local publicity. Mr. Paul also submitted a report of his investigation of the subject of Liability Insurance.

Mr. Tomlinson submitted a report on Conventions and Meetings. It was suggested that a joint meeting of Pacific Coast associations was desirable.

Report of the Committee on Credits and Accounting was submitted by Mr. Scott.

Mr. Stroufe presented an interesting statement on relations with jobbers.

Mr. Tomlinson reported for the Committee on Statistics and Mr. Paul for the Committee on Merchandising.

Mr. Jaggar, for the Architects Committee, pointed out the need of closer cooperation and much needed changes in the manner of drawing specifications for electrical work.

Capt. W. J. Conway, the genial Secretary of the British Columbia Association of Electrical Contractors and Dealers, gave a very interesting talk on conditions in British Columbia and urged closer cooperation between the two associations.

Mr. P. F. Letts, also representing the British Columbia organization, spoke along similar lines.

Mr. Kenney, who has been elected to succeed Mr. Hall as chairman of the association, presided at the meeting Saturday morning.

Following an interesting talk on the Priorities and War Industries program by Hon. Chas. H. Carey, State Chairman of the War Industries Board, several interesting papers—two of which are published elsewhere in the Journal—were read by B. W. Paul on "Electrical Retail Merchandising," Geo. L. Oman on "Observations of a Jobber" and C. P. Scott on "Turnover as it Affects Profits."

Saturday afternoon and evening were devoted to automobile trips along the Columbia Highway and a chicken dinner and entertainment at Mrs. Henderson's on the Highway.

Capt. W. J. Conway, secretary of the British Columbia Electrical Contractors and Dealers' Association, B. F. Letts of Vancouver, B. C., and C. H. E. Williams, the father of the Contractors' Association in British Columbia, were guests of the Oregon Association.

A Cooperative Conservation Convention

An enthusiastic family cooperative conservation convention of about 60 agents of the Edison Lamp Works, the salesmen and engineers of the General Electric Company and Pacific States Electric Company was held in the ballroom of the Palace Hotel, San Francisco, on September 27. The purpose of the meeting was to discuss ways and means of cooperating with the Fuel Administration in the conservation of electric power for war industries and of adjusting their merchandising business to war conditions.

F. D. Fagan, district sales manager of the Edison Lamp Works, presided. The following speakers led the discussions which were liberally contributed to by most of those present: E. O. Shreve, local manager of the General Electric Company; D. E. Harris, vice-president and sales manager of the Pacific States Electric Company; Harry Bostwick, manager San Francisco district, Pacific Gas & Electric Company; M. J. Verdery, representative of G.-E. Division, Edison Electric Appliance Company; W. E. Camp, General Electric Company; Melville P. Meyer, retail sales manager Nathan-Dohrmann Company; Harry Daley, Pacific States Electric Company, and L. E. Voyer, Edison Lamp Works.

A get-together luncheon was served in the same room at which T. E. Bibbins, president of Pacific States Electric Company, gave an excellent talk on esprit de corps. Saturday, September 28th was devoted to a trip through the General Electric Company's Oakland Mazda lamp factory where the agents could see how Edison Mazda lamps are made ready for the counter. A war-time luncheon was served in the factory's spacious cafeteria. F. D. Fagan gave a talk on the development of the incandescent lamp and H. H. Barrows, manager of the factory, briefly outlined the history of the Oakland factory.

BUILDERS OF THE WEST — XXXVII

EDWARD B. STRONG

Constructive vision has through all ages been recognized as the potent factor in building the commercial and industrial empires of the world. To E. B. Strong, president of the Technical Publishing Company, publishers of the Journal of Electricity, this Jubilee issue commemorating thirty-one years of service of the Journal of Electricity in the West, is dedicated by the Journal staff in appreciation of his far-sighted vision of the engineering and commercial supremacy of the great West that has at all times been the urge and inspiration of this journal in disseminating throughout the known world over fifty billion good words for the West.

The two days convention was enthusiastically voted a decided success by all present.

It was brought out in the meeting that 20,000 horsepower would be saved if all the carbon and gem lamps now being used in California were replaced with Mazdas.

San Francisco Electrical Development League

The following committees were appointed by Garnett Young, the recently elected president, to serve for the ensuing term:

Public Policy Committee—T. E. Bibbins, chairman, E. J. Wallis, R. F. Behan, L. H. Newbert, W. H. Siever.

Finance Committee—W. S. Berry, chairman, C. E. Wiggin, D. E. Harris, C. F. Butte.

Visiting and Relief Committee—F. J. Cram, chairman, E. M. Cutting, R. M. Alvord, L. A. Nott, A. H. Elliot, James Redpath.

Reception and Attendance Committee—Arthur E. Rowe, chairman, A. L. Meinema, vice-chairman, H. B. Squires, W. R. Dunbar, George Curtis, Miles F. Steele, E. E. Brown, T. J. Bennett, S. L. Hawken, H. P. Treat.

Entertainment Committee—J. F. Pollard, chairman, Robert Sibley, vice-chairman, E. O. Shreve, Tracey Simpson, Harry Bostwick, R. E. Fisher, Ira J. Francis, C. E. Ingalls.

Membership Committee—W. B. Sawyer, chairman, F. E. Boyd, vice-chairman, Arthur Kempston, W. K. Brown, H. S. Jones, J. B. Black, R. A. Balzari, Leslie Brown.

Publicity Committee—A. H. Halloran, chairman, Nathan Bowers, Max Loewenthal.

COOPERATIVE CAMPAIGN MEETING IN THE SOUTH

(An epoch making gathering of California Electrical Campaign interests in Southern California in which a step forward is taken in cooperative helpfulness. The general report of the meeting is given here to be followed by a more detailed review of the principle talks in the next issue of the Journal of Electricity.—The Editor.)

The great importance and wide scope of the work now being conducted by the California Electrical Cooperative Campaign was most forcibly explained at the Cooperative Campaign dinner held in Los Angeles, Friday evening, October 4th. The Cooperative Campaign Advisory Committee, which had the responsibility of arranging the business end of the evening's program, performed its work well and in a series of talks bearing directly on the many phases of the campaign work, drove home the seriousness of the task more effectively than ever before attempted. So comprehensive was the program and the recitals so interesting that a gathering of 330 people sat through the meeting, which had been considerably lengthened by the preliminary introduction of several Liberty Loan and entertainment features.

Mr. Russ H. Ballard, vice-president of the Southern California Edison Company, guided the meeting and in his characteristic way, as toastmaster, spread a feeling of geniality and good-fellowship throughout the evening.

The Campaign program with the various phases of the work was opened by **Mr. L. H. Newbert,** commercial manager of the Pacific Gas & Electric Company, San Francisco, who is also chairman of the Advisory Committee, having in hand the direction of the Campaign work. Mr. Newbert presented the objects and aims of the campaign together with a report of its accomplishments to date.

Mr. A. Emory Wishon, assistant general manager of the San Joaquin Light & Power Corporation, Fresno, followed with a most impressive talk on the "Central Switch Problems of Today." He told of the need for additional hydro-electric developments in California and the necessity for interesting the public and the Government in this development work.

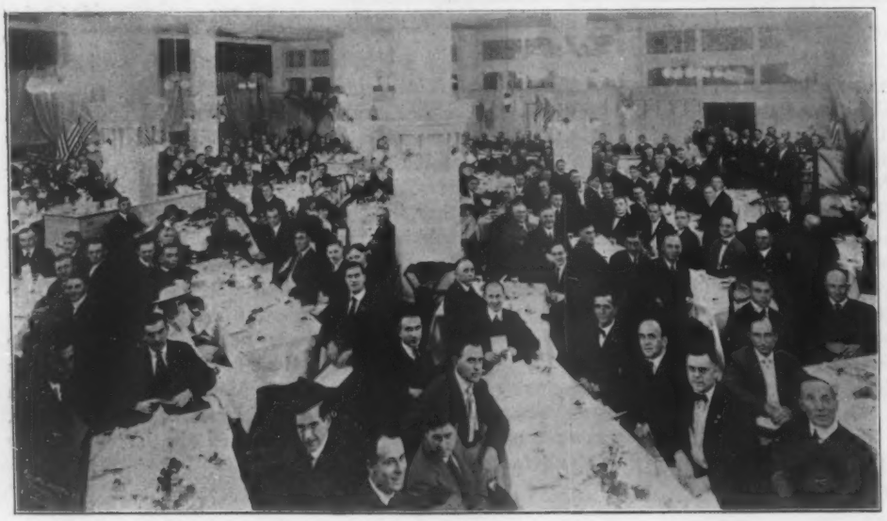
The all-absorbing question of Priorities was handled by **Mr. D. E. Harris,** vice-president and sales manager of the Pacific States Electric Company, San Francisco, in a well delivered talk on "War Industries Board Rulings Affecting Our Industry." The subject being most important to all branches of the electrical industry at the moment, Mr. Harris' remarks were given most earnest thought.

Mr. R. M. Alvord, manager supply department, General Electric Company, San Francisco, dwelt on the "Present Importance of Association Work" and put forth many highly important arguments for the preservation and still greater development of business associations, stating that such as exist at present demonstrated the necessity for team work and of men belonging to their craft associations.

The "Proposed Advertising Campaign" was handled by **Mr. G. B. McLean,** assistant manager of sales, Southern California Edison Company, Los Angeles. This Campaign provides for the tying-in by means of newspaper advertising and window displays of the cooperation work with "service to the public" idea.

Mr. M. L. Scobey, of the "Home Electrical," San Francisco, presented many ideas and plans as to "How the Electrical Dealer Can Best Serve the Public Under Present War Conditions," while **Mr. G. E. Arbogast,** vice-president of the F. E. Newbert Company, Los Angeles, spoke on "Today's Opportunities for the Electrical Contractors." The two latter papers were most valuable especially to contractor-dealers, as they presented many suggestions for developing new avenues of business during the stress of war times.

The meeting was held in Hamburger's Cafe. The big banquet hall was attractively arranged, the speakers' table



Good feeling and the union of effort to loyally meet the demands of business on a war basis were the elements which went to make the spirit of the three hundred and thirty electrical men and women of the Southland with a goodly intersprinkling of visitors from farther north who gathered in Los Angeles to further the California Electrical Cooperative Campaign.

extending across one end of the room while the remainder of the banqueters were gathered at a larger number of smaller tables. The flags and colors of the allied nations were displayed in profusion. A feature of the decorations was a miniature of the Statue of Liberty. Small electric lights illuminated the setting and in the surrounding waters lurked a hostile submarine while destroyers of the United States Navy patrolled the passageways. Suddenly the submarine and its pursuers became active and for several minutes an interesting and spectacular battle, replete with electrical display and miniature gunfire, took place, and the inevitable resulted. This entertaining exhibit was the work of Mr. W. G. Lane of the General Electric Company.

Augmenting the attendance of the meeting was the presence of two score women identified with the electrical industry in the south, led by **Miss Gertrude Tucker** of the Southern California Edison Company, who has won a place of fame and security in the electrical industry of the state as an exponent of the position of women in the public utility field. Miss Tucker talked entertainingly of "War and Women," telling of the accomplishments of the gentler sex in filling war-time positions.

Col. H. D. Loveland, member of the California State Railroad Commission, was the distinguished guest of the evening. His address, "Let There Be Light," dwelt eloquently upon the problems of the war and made a vivid appeal for unity of thought and action in the present crisis.

"Pep" was injected into the meeting from the very "take off" by **Major Wishard, U. S. A.,** in a thrilling four-minute talk, starting off with a real American battle-cry and followed with an impressive explanation of what the monies obtained from the sale of Liberty Loan Bonds are used for.

Mr. A. N. Kemp, comptroller of the Southern California Edison Company and a leader of the Fourth Liberty Loan drive in Los Angeles, discussed "War Time Finances."

Mr. A. H. Halloran, secretary Pacific Coast Section, National Electric Light Association, and associated with the Journal of Electricity of San Francisco, explained the work of the Pacific Coast Section of the N. E. L. A., setting forth the need for supporting its work and the advantage of membership in the body.

Mr. S. M. Kennedy, general agent of the Southern California Edison Company, Los Angeles, made the closing address of the evening, during which he announced revisions in the policy of his company that were of much interest to the contractor-dealers in his territory. The restrictions placed by the Government on the manufacture of carbon and Gem lamps will automatically discontinue his company's free distribution of lamps, the speaker prophesied. The company will also discontinue the sales and contracting branches of its business as speedily as the contractor-dealers in the various communities can absorb the work.

A particularly pleasing feature of the banquet was the singing. A special book of songs was at each plate and under the direction of an assembly leader they were given during the evening, in addition to renditions by soloists.

A review of the evening's talks will be given in greater detail in the next issue of the Journal of Electricity.

Fresno Meeting Planned

A great gathering of the lower San Joaquin Valley electrical interests is planned for some time in November, although the date is not as yet finally fixed. The details of the meeting have not yet been arranged but it is promised that the gathering will bring out the full spirit of the campaign and the recent developments of importance. All those interested in affairs electrical from all districts are urged to attend, but especially from the San Joaquin Valley Section from Modesto to Bakersfield.

JOINT MEETING OF FIVE ENGINEERING SOCIETIES IN SAN FRANCISCO

On the evening of September 26, 1918, there was held at the Engineers' Club in San Francisco one of the most remarkable joint meetings of engineering talent ever attempted in the West. The local Sections of five national engineering societies were represented—the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers, and the American Chemical Society. About 325 were in attendance.

In opening the meeting, **E. C. JONES,** chairman of the San Francisco Section A. S. M. E., spoke as follows:

"The American Society of Mechanical Engineers gives you greeting and bids you welcome to a Joint Meeting of the San Francisco Local Sections of the five great engineering societies. This is intended to be the first of a series of joint meetings dealing with timely subjects and telling of the activities of the engineer in helping to win the war.

"The subject of this evening's meeting is 'Fuel Conservation.' This subject will be treated by officials of the administration, who will tell us what they wish to accomplish and we will tell them what the engineer will do to help them accomplish their purposes. It also gives us as engineers an opportunity to explain why we are not in France."

The following papers were then read:

"Fuel Conservation," by Mr. Albert E. Schwabacher, United States Fuel Administrator for California.
"Production of Energy," by Mr. A. H. Markwart, Civil Engineer.
"Future Requirements of Oil," by Mr. D. M. Folsom, United States Fuel Administrator, Oil Division.
"The Use of Gas as a Conservation Measure," by Mr. John A. Britton, Vice-President and General Manager Pacific Gas and Electric Company.
"Electrical Consolidations and Their Relation to Fuel Conservation," by Mr. H. G. Butler, Power Administrator.
"Sources of Energy Supply," by Mr. P. M. Downing, Chief Engineer Electric Department, Pacific Gas and Electric Company.
"District Steam Heating, as Related to Fuel Conservation," by Mr. Harry S. Markey, American Society Mechanical Engineers.
"War Industries," by Major George F. Sever.

The paper by Albert E. Schwabacher, federal fuel administrator for California, very properly outlined the necessity for fuel conservation throughout the nation. The main features of this paper may be found in the Journal of Electricity for October 1, 1918, p. 329. The paper of Harry S. Markey was published in full September 15, 1918, p. 281, while extended abstracts of the papers by D. M. Folsom, H. G. Butler and P. M. Downing appear elsewhere in this issue. In the next issue of the Journal of Electricity, the paper of W. R. Davis on railway electrification will appear in full. It is with considerable regret that due to recent rulings of the War Industries Board in limiting and curtailing periodicals, the Journal of Electricity is unable to publish in full all of the papers presented, as they are of high order.

The discussion brought out many interesting points. In addition to touching on the limiting power for gold dredging and the growing use of pulverized coal in the Northwest the main discussion hinged on the use of the Diesel engine for the new merchant marine and the early probability of new power development in California to relieve the fuel situation and the present shortage of power. The discussion in full on the Diesel engine and power shortage was as follows:

CAPT. ROBERT W. A. BREWER: One of the speakers —I think more than one tonight—mentioned the matter of oil-burning ships, and I should like to have if possible an answer on the following point. You have had notably more experience out here with oil-burning ships—external combustion and internal—than we have; and I would like to know if you have arrived at a definite conclusion as to which is the most suitable for commercial work, the oil-fired steamer or a Diesel engined steamer, and whether the capital cost of the Diesel engine ship is offset by the saving, whether it is a question of size of ship or speed of ship or miles sailed per annum. Of course it is quite obvious—at least it appears obvious to me—that an oil fired ship, an oil fired steamer, is

going to have always the advantage where it is a question of speed and not economy particularly; and I can give you one little instance where an oil fired steamer crossed the Atlantic in two and one-half days and went back again in two and a half days more. There was no question there that the oil firing had points; but when it comes to a commercial proposition there must be some line of demarcation between the two, and I should like to know if you have arrived at it.

D. M. FOLSOM: Capt. Brewer has raised one of the most interesting engineering problems, as far as marine operation is concerned, that we have. The answer is not yet ready. That is all that I can say. There are ships that are being very successfully operated by internal combustion engines but under different conditions than those of the oil-fired boiler. These tests are being now prepared and the necessary figures are being collected to make them directly comparable. At present they are not comparable, that is, not directly comparable, on account of different service, different speed conditions; and we have only been operating the Diesel engine, especially on this coast, for a relatively short time. Some of those figures have not been comparable. They have been, you might say, trade secrets of the owners of the ships, but we are preparing at this time a direct comparison, and I would be glad, Captain Brewer, to put you in touch with people who can give you a much better answer than I can at this time.

CAPT. BREWER: Could I ask one other question, whether you are building standard ships with Diesel engines, or whether they are the old steam engines?

D. M. FOLSOM: My understanding is that all of the ships being built by the Shipping Board are for either reciprocating engines or steam turbines; but I do know that Mr. John Rosseter, who has just gone to Washington from this city to direct the operations of the United States Shipping Board, is firmly convinced that the Diesel engine is the coming motive power. Now, he bases that on the experience of shippers of the Pacific Coast, of his own company—W. R. Grace & Company—and the experience of the Matson Navigation Company; but at the present time the program of ships being built and engines being installed are all either reciprocating or turbine.

J. W. BECKMAN: I would like to ask Major Sever, if it is not an imposition, if there is any chance, for the benefit of those interested in power development on the Pacific Coast, for him to drop a hint of what he proposes to do to relieve the power situation? He may perhaps be unable to answer that.

THE CHAIRMAN: Do you care to answer the question?

MAJOR G. F. SEVER: Last December it was published that the electric power shortage in this country was going to be extremely intense. Under the careful direction of Col. Charles Keller, of the office of the Chief Engineer, and of Mr. Buckley and Judge Parker, of the Priorities Board in Washington, the power section of the War Industries Board was organized; a number of engineers were gotten together, put into uniform, and went around the country to investigate the sore spots in the electric power shortage. I was sent out here. I have been here two months in San Francisco investigating power conditions up and down the California coast—the State of California, after having previously been in Seattle and in Portland. My investigations show that you need at least 100,000 kilowatts by next summer—25,000 for making up the present deficiency, 25,000 for the natural increase covering the growth of war industries and war essentials and public necessities, and about 50,000 for the replacement of the use of fuel oil. In an extremely inspiring talk with Mr. Rosseter in company with Professor Folsom the other day, he left the impression that he wanted 80,000,000 bbls. of oil for his shipping. He said, you gentlemen here, no matter what associations you may have, should pull together, and pull off the biggest and most wonderful problem that has ever been carried out in this country, and that is the near elimination of fuel oil in public utilities and the development of kilowatts and kilowatt hours to your limit. He said there is no limit until you have replaced between 50 and 80 million barrels of oil per annum. Then you are reaching a definite goal. The programs which I have talked over with the power companies in this state, and visiting the power sites of a number of them, and in going to Hetch-Hetchy tomorrow to look at another one, indicate that there could be developed by next summer in hydro-electric only about 9000 kilowatts; by the summer of 1920 about between 80,000 and 100,000 kilowatts; by 1921 somewhere around 75,000 kilowatts, all this being used for normal increase, making up deficiency and the elimination of fuel oil. The situation is serious. If you do not have snow and rain for your storage reservoirs and your stream flow conditions this next winter, next summer is going to be an extremely serious situation, and all the street cars in San Francisco may have to be taken off Market street. I wonder that street cars are permitted to operate as they do—with all due respect to those to whom I speak—because over and over again in both directions cars are running at the same time without load. That is one of the things that I am supposed to investigate but have not yet had time, and do not expect to, because that matter is being handled by a very efficient power administrator. I want to say that there are four projects at the moment, three of which can be financed by the companies and organizations that are handling these if they secure a note of encouragement from Washington. That request I am making, so that the War Industries Board and the War Department will indicate that these power developments be carried out, and when this authorization and request comes from those bodies they will be utilized, I am sure, by these companies in furthering the finances which will be necessary for the carrying out of these power projects, and all of these projects involve both hydro-electric development and additions to the boiler capacities of some of the steam plants. The steam plants have been under-boilered on account of the situation that has previously obtained; and now, if they are brought up to full capacity there will be less difficulty than heretofore. So you may know that your power companies are cooperating by trying to carry out these projects, and I am sure they will. But you will have no large assistance until the summer of 1920.

THE CHAIRMAN: Gentlemen, the discussion is now closed, and I will entertain the motion of the member of the American Institute of Electrical Engineers.

MAX LOEWENTHAL: Mr. Chairman,—and fellow members: I intended to say a few words, but the hour is up, and I will simply make a motion of appreciation of the words of wisdom which have flowed, not alone from our fellow members, our own engineers, but the representatives of the Government, the fuel and power administrators and their associates, and especially the representative of the United States Army:

"Be It Resolved—That it is the sense of this meeting that we have absolute faith in the ability and patriotism and appreciate the services which these gentlemen are rendering to our Government, combining with a keen sense of duty a full appreciation of the needs of the industries and the people of the Pacific Coast; and if it is in order and not against Government regulations, I move furthermore, that a copy of this resolution properly worded by your officials be forwarded to the authorities in Washington." (Applause.)

THE CHAIRMAN: Gentlemen, you have heard the motion. Is it seconded? (The motion being seconded, was carried unanimously.) Let me suggest that the question of referring this matter to Washington be left entirely in Major Sever's hands. If he says "Yes" we will send it, and if he objects to it we will not.

(Thereupon the meeting adjourned.)

HAPPENINGS IN THE INDUSTRY

EMERGENCY POWER BILL PASSED BY HOUSE

The House has passed without a dissenting vote and sent to the Senate the Administration emergency power bill, providing for Government acquisition and extension of electric power plants. It authorizes the expenditure of $175,000,000 for extending existing plants for building new ones.

DAYLIGHT SAVING PASSES SENATE

The daylight saving law would remain in effect until rescinded by Congress under a bill passed recently by the Senate. The measure, which was indorsed by Chairman Baruch of the War Industries Board, in the interest of fuel economy, now goes to the House. Under the present law the clocks would be turned back an hour October 27.

CEMENT PIPE COMPANIES CONSOLIDATED

The Portland Cement Pipe & Tile Company, located at 401 River street, Portland, Ore., have pooled their interests with the Concrete Pipe Works, with plants at Vancouver, Tacoma, and Walla Walla, Washington. Since the consolidation, the name has been changed to the Concrete Pipe Company with principal offices in the Board of Trade Building.

LIGHTLESS NIGHTS IN CALIFORNIA

Northern California municipalities are to have five bright instead of five dark nights a week, according to an order issued by State Power Administrator H. G. Butler, removing all state restrictions on street and sign lighting. A federal order requiring lightless Mondays and Tuesdays to save fuel still remains in effect. The rainfall in the mountains and the reservoir conditions, together with the great decrease in the use of water for irrigation, have made it possible to resume more normal conditions.

MANUFACTURES TO BE RESTRICTED

Additional curtailments in the manufacture of articles not essential to the prosecution of the war have been announced by the War Industries Board as a part of the general program for the conservation of material, labor, fuel, transportation and capital. During the six months' period from October 1, the manufacture of electric heating appliances, oil stoves and sewing machines will be curtailed to 50 per cent of six months' production during 1917. No road-making machinery can be manufactured except for the Government, railroads, public utilities or municipalities and counties.

DEMAND FOR ELECTRICAL APPARATUS IN JAPAN

According to the report of the Investigation Bureau in the Department of Communications the demand for the elec-

the Department of Communications the demand for elec-

Year.	Generators. Yen	Transformers. Yen	Motors. Yen	Total. Yen
1915	7,202,000	2,150,000	6,120,000	9,042,000
1908	305,800	.....	508,000	.....
1909	213,200	568,000	523,000	1,304,200
1910	520,000	882,000	585,000	1,987,000
1911	602,300	1,353,000	1,040,000	2,995,000
1912	1,258,300	2,385,000	1,930,000	5,561,300
1913	1,121,000	1,858,000	4,030,000	7,009,000
1914	1,750,000	3,946,000	4,400,000	10,076,000

TAX EXEMPTION FEATURES OF THE FOURTH LIBERTY LOAN

Every large holder of Government bonds is interested in the unusual tax exemption features of the Fourth Liberty Loan.

Interest on $30,000 of the Fourth Liberty Loan is exempt, until the expiration of two years after the war, from surtaxes or excess profits and war profits taxes. Furthermore, the taxpayer who subscribes for $30,000 of these bonds, and still holds them at the time of making his tax return, will receive exemption from these taxes for the same period upon the interest on an aggregate amount of $45,000 of bonds of previous Liberty Loans.

Subscribers to amounts of less than $30,000 of the Fourth Liberty Loan will receive a proportionate similar exemption; that is, one subscribing to and still holding, at the time of the tax return, $10,000 of the Fourth Liberty Loan bonds, will receive exemption on the interest on $15,000 aggregate amount of the other Liberty Loan bonds.

GOVERNMENT OPENINGS

California Applicants for Army Engineer Corps —

Californians whose applications for commissions in the Army Engineer Corps were acted upon favorably by the Military Bureau at the University of California, but who were not examined by the Army Examining Board last summer, must wait their turn for examination, according to word received from Major General W. M. Black, Chief of Engineers, U. S. A.

Air Service Re-Opens for Civilians —

The Army Air Service is again open to civilians who wish to apply for training for commissions in either the Flying or Balloon Division, the Military Bureau at the University of California has been informed. All such applications were held up a number of months ago as the result of the many names on the waiting list for entrance to Air Service Training Schools. Applicants must have the following qualifications: American citizenship, perfect eyesight and hearing, partial college education, or high school education with equivalent of partial education; age—pilots or flyers 18 to 30, preferably 18 to 25, balloonists 18 to 40. Applications should be entered at Air Service offices. No applications for non-flying commissions in the Air Service are being accepted at this time.

Oregon Guard Engineers' Company —

Portland engineers, architects, contractors, construction men, building mechanics, building laborers and others will be interested in the Company C, Oregon Engineers, attached to the Oregon State Guard, which company is now in process of formation. It is planned that this company will have within its ranks men familiar with all forms of construction, timber, steel, concrete and reinforced concrete, and to have men familiar with the planning, designing and actual construction.

Labor Board Offices in San Francisco —

A branch office of the Labor Board of the United States Navy Yard at Mare Island has been opened at Room 406 Grant Building, corner of Market and Seventh streets, San Francisco. The new office is prepared to furnish full information in regard to appointments at the Navy Yard and assist applicants to complete their applications, and will give the required physical examinations without cost. In addition to the physical examinations, applicants are required to file brief statements of their training and experience, and to give names of satisfactory references or vouchers. Applicants must be either citizens of the United States or of countries allied with this country in the present war. At the present time there is urgent need for mechanics, helpers and other classes of employes at the Navy Yard.

BUSINESS COURSES

The University of California Extension Division announces the opening of the following classes:

COMMERCIAL LAW—Dr. L. J. Ayer, instructor. This course will be similar to the one which Dr. Ayer will give before the American Institute of Banking, but will be modofied to meet the needs of the class.

BUSINESS MANAGEMENT—Mr. E. W. Barnhart, instructor. In business management, office management, and office methods and systems.

ADVERTISING—Mr. Samuel J. Johnston, instructor. A study of the appeal to the manufacturer, to the retail merchant, and to the consumer through appropriate publicity.

SALESMANSHIP—Mr. James Lynch, instructor. Lectures, discussion, and demonstration.

Courses in **Russian, French, Chinese, Japanese** and **Spanish** are offered.

BUREAU OF MINES WAR ACTIVITIES

The necessities of the war situation have stimulated in many ways to greater activity the functions of the Bureau of Mines, Department of the Interior. In the field of actual mining and milling numerous field engineers have been active, and the policy has been adopted of having these men afford immediate help in the way of advice as to correct mining and milling methods. In the various Bureau of Mines experiment stations, special problems of ore treatment have been and are under investigation. Satisfactory experiments in the concentration of the western chrome ores have been made at Seattle, and experiments on the west Texas sulphur ores show their probable amenability to the flotation method. These are only examples of numerous investigations on milling methods, which cover manganese, graphite, and other war minerals. Laboratory investigations with the view of increasing the supply of electrodes so as to make them available for western electric furnaces, are under way in Colorado. The War Minerals Investigation organization has provided for handling the questions of priorities, both of railroad transportation and of supplies and fuel, and a very large number of applications have been handled. The platinum situation has been closely studied by the Bureau, and in cooperation with the War Industries Board plans and regulations have been drawn up which it is believed will enable a satisfactory handling of this commodity, and these regulations will be put into effect through the War Iidustries Board.

THE GEAR MANUFACTURER IN WAR SERVICE

At the Syracuse meeting of the American Gear Manufacturers' Association, its president, T. W. Sinram, delivered an unusually interesting address on the war service of the gear manufacturers. He explained that their contribution to the war cause was an indirect one, since gears almost invariably become a part of some other item and are not purchased directly by the government. But he emphasized the magnitude of their responsibility. "How many realize,' 'he asked, "the multifold applications of our product involved in the war requirements? There are gears in

Every ship that sails the seas—
Every airplane that flies the air—
Every submarine that plies the depths—
Every truck that transports men, supplies and what not—
Every military tractor that pierces the enemy's front—
Every farm tractor aiding in the food supply for military and civilian at home and abroad, and in—
Cranes, steam shovels, gasoline locomotives, trench engines, guns and gun mounts, etc., etc.
Gears are also vital maintenance items for mines, mills and electric motor cars—
And the half has not been told."

He urged maximum production, cooperation, and finally, standardization of product and of method. "This has become a patriotic duty," he insisted, "and is not only encouraged, but expected by the government."

RULING ON TRADE ACCEPTANCES

The Federal Reserve Board has ruled that it does not approve for general use a form of trade acceptance which contains the condition that any discount will be allowed if payment is made before maturity.

TRADE NOTES

Wave Motor Company —

The Pelton Automatic Wave Motor Company of Santa Fe has incorporated with a capitalization of $100,000, with headquarters at Santa Fe, N. M.

Change in Ownership —

Winder & Jones, of 238 North Citrus Avenue, Covina, have purchased the W. O. Johnson electrical business in Baldwin Park.

New Location —

The electrical shop of T. M. Ryan will move from its present location to 330 Grand Avenue, South San Francisco.

Mazda Celebration —

Admission Day, September 9th, was again this year celebrated by the Edison Lamp Works and their agents throughout California. Between 240 and 250 special show windows were installed, advertising the Edison Mazda Lamp as "California's Native Sun, made in California." The special windows featured the idea "Bear in mind the lamp that is made in California"; "Edison Mazda—California's Native Sun." Something over 12,000 sq. inches of newspaper advertising space was used throughout the state. The keynote message of these ads was: "Turn out your unnecessary lights and conserve electric power for California's war industries. California products for Californians."

Enlarged Plant —

The Rothert Process Steel Company, 622 Harriman street, Seattle, which has been producing 1000 pounds of high grade tool steel a day by means of its electric furnace, is enlarging its plant and will specialize on high-speed tool steel and bring the output up to 2000 pounds per day. The new equipment consists of steam hammer, reheating furnace, etc. It is also relining its present furnace and making other improvements. The ore from which this steel is made is magnetite and is secured in British Columbia and east of the Cascade mountains in Washington. There is an unlimited supply at either place. Several tests have been made recently of the tensile strength of the high carbon steel made by this process from magnetite ore. On a carbon steel running one and three-tenths per cent carbon the test showed the tensile strength to be 103,310 pounds to the square inch. In steel running one per cent carbon the test showed 112,180 pounds to the square inch and in steel running .75 carbon it was 142,800 pounds to the square inch. These tests show very high tensile strength for high carbon steels.

New Business in the Northwest —

The Standard Electric Company, 73 Horton street, Seattle, has the contract for installing the electrical equipment in the mills of the Puget Mill Company at Port Gamble, on Hoods Canal. The electrical equipment includes, besides the turbine, two 300 horsepower motors for the headsaws in each mills and over 70 other motors varying in size from three to 300 horsepower. The company also has the contract for wiring the entire plant for a modern lighting system and a contract for alternating current system for lighting the town of Port Gamble.

A. H. Cox Company, 307 First Avenue South, Seattle, is busy on a number of medium sized installations and changes in equipment. A two-phase 20 horsepower motor is being installed for the Porter Baking Company at 501 Third avenue North which will operate one of the largest dough mixers in the city, using about two barrels of flour every 15 to 25 minutes. It is changing over the entire system of the National Steel Construction Company on the Duwamish Waterway, including its crane, from two-phase 220 volts to three-phase 440 volts. The A. H. Cox Company is making a number of improvements in its facilities for handling stock. A new store room is being constructed on the second floor in which the stock of the company will be cared for and space allotted in such a way that the company's large stock of pumps, motors, compressors, steam engines, etc. can be displayed to best advantage.

Attacks Seven-Cent Fare —

Legality of the seven-cent street car fare at Tacoma has been attacked by W. D. E. Anderson, a real estate dealer who filed information against the Tacoma Railway & Power Company, alleging in his complaint that the company is collecting an exhorbitant fare in violation of a state law and city franchise. He asks that a restraining order be granted prohibiting the collection of more than five cents for a single fare.

Improved Car Service —

Executive and operating officials of the Pacific Power & Light Company were recent visitors in Astoria, Oregon, going over matters pertaining to improved street car service and more power facilities. The company already has a number of men at work on the betterments.

Pulverized Coal as a Substitute —

Walter Horne, 2507 Tenth Avenue West, Seattle, representing the Fuller Engineering Company, Allentown, Pennsylvania, installation engineers and manufacturers of pulverized coal machinery, reports that the British Columbia Sugar Refinery at Vancouver, B. C., is replacing 20,000 barrels of fuel oil under fourteen boilers with pulverized coal, two of the boilers being new 500 horsepower Bandenhausen boilers. The installation consists of 1500 ton coal storage, 400 foot belt conveyor, conveying about 200 tons of Vancouver Island screenings a day. These screenings are dried in a Fuller drier, pulverized in three Fuller mills, thence conveyed by screen conveyor to the boiler bins. The cost will be about $150,000 and the boilers should be operated in a short time. Machinery is all assembled and construction crews have the installation under way. A considerable saving is anticipated in the use of powdered coal over oil. High efficiencies have been secured by this company under boilers at the Garfield smelter of the United Verde Mining Company at Parsons, Kansas. The boilers, driers and other equipment at the Vancouver plant are of the same type as those installed at the steam plant of the Puget Sound Traction Light & Power Company on Western Avenue, Seattle, by Stone & Webster. This equipment consists of two large Fuller driers and four Fuller mills which will be required to deliver about 300 tons of pulverized coal a day for firing three hundred horsepower boilers for heating the major portion of the down town district in Seattle.

Irrigation and Electricity —

F. J. Pingry, manager of the Burbank Irrigation Project, will leave shortly for Washington, D. C., to confer with the Secretary of the Interior concerning the development of Five-Mile Rapids on the Snake river north of Pasco. This project would open for cultivation about 60,000 acres of arid land, besides furnishing cheap electric power for the entire Inland Empire.

New Contracts —

Pacific Machine Shop & Manufacturing Company is now occupying new works on the Duwamish Waterway, Seattle, and is busily engaged in completing numerous contracts it holds with the contractors of the Emergency Fleet Corporation for steam anchor windlesses, winches, steering gears, capstans, etc. The company also makes a specialty of complete oil installations and advocates the use of electric deck accessories for such installations and has developed a standard line of accessories which have been placed on a large number of vessels built on the Pacific coast.

RECENT PATENTS FROM THE WEST

Method of Controlling Electrical Power Transmission

Patent No. 1, 265,184, issued to Herman D. Ewbank, Jr., of Portland, Oregon, shows a new method of controlling electrical power transmission. This method consists in driving a generator at different speeds to produce different voltages at the terminals thereof, connecting across the terminals of the generator, motors of predetermined resistance in varying connections and interrupting the forcible drive of the generator between each two successive steps of motor connections in the outer circuit without braking the generator.

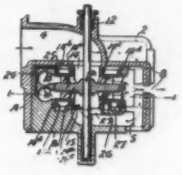
The motors are first connected in the outer circuit in series, and after the interruption of the positive drive of the generator, the connection is changed to a parallel arrangement, and then the positive drive of the generator is reestablished before the generator has had an opportunity of coming to a stop.

Traffic Guide Signal

Patent No. 1,267,967, issued to Albert C. Brunnworth and Clarence M. Sackett, of Anaheim, California, shows an illuminated traffic guide signal. This signal is adapted to be embedded in the pavement of the street and acts as a guide to traffic to keep the traffic moving in its proper path. The guide consists of an open-ended receptacle adapted to be embedded in the earth, the inner edge of said receptacle being grooved for the reception of a retaining ring. Mounted in the groove is a semi-spherical light transmitting element and arranged over this light element is a latticed iron guard which protects the element. The semi-spherical light transmitting element which is preferably of very heavy glass, projects above the pavement, and an incandescent lamp is arranged in the pocket below the light transmitting element so that at night the element is clearly visible.

Hydraulic Balance for Centrifugal Pumps

Patent No. 1,267,512, issued to Wm. D. Carter of San Jose, California, shows a new form of centrifugal pump. This pump has two or more double service impellers, each capable of series or parallel operation. A pair of suction passages and a discharge passage is connected with each impeller and means are provided for changing the connection of said passages so that the impellers may be operated in series, in



parallel, or in multiple series, and a hydraulic, end-thrust balancing means is provided for automatically balancing the impellers whether the device is operated in series, in parallel or in multiple series. Each impeller is provided with a pair of concentric flanges and the casing is provided with corresponding flanges which cooperate with the flanges on the impeller to form a hydraulic counterbalancing chamber on each side of the impeller. Each of these counterbalancing chambers is in leakage connection with the intake and leakage connection with the discharge column.

Tread for Tractor Wheels

Patent No. 1268445, issued to R. B. Fageol of Oakland, and Charles A. Smith of San Francisco, California, shows a new form of tread for tractor wheels. This tread comprises a rim carried by the wheel, and a series of tread shoes peripherally disposed about the rim and movable with respect thereto. These shoes are connected together by an endless flexible member associated with the rim which operates to retain the shoes in operative relation with the rim. The flexible connection permits a plurality of the tread shoes to have simultaneous contact with the ground.

Reinforcing Coil for Concrete Pipe

Patent No. 1,267,835, issued to Julius G. Zwicker of Berkeley, California, shows a novel form of concrete pipe. The reinforcement for this pipe consists of a hollow metallic skeleton comprising longitudinally and circumferentially disposed members, the ends of the longitudinal members projecting beyond the terminal circumferential members. At one end of the skeleton these projecting ends are turned inwardly and at the other end they are turned outwardly to lie substantially flush with the inner and outer surfaces of the pipe.

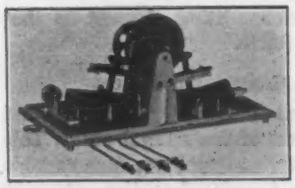
LATEST IN EVERYTHING ELECTRICAL

(From the generation of hydroelectric energy to the pumping of water in agriculture and industry, water measuring instruments have almost as much electrical application as generators and motors. An interesting line of water level recorders is here described. A convenient package tying machine, a side outlet current tap of standard specifications and a huge transformer for the Government are further reported.—The Editor.)

STEVENS WATER LEVEL RECORDERS

The accurate recording of water levels by automatic devices appears to have been successfully solved by J. C. Stevens, Mem. Am. Soc. C. E. of Portland, Oregon, with the designing of his Stevens Continuous Water Stage Recorders.

The list of instruments is primarily divided into two classes:



Sender for long distance recorder

1. Instruments to record the fluctuntions at the point where they occur, and
2. Long Distance Recorders by means of which the graph is produced at some distant station, or office.

The first class includes the following:

Type A, an instrument that will record any range of stage, and will run from 40 to 100 days or even longer up to six months with one setting. It is driven by a power weight.

The record is made on a 11 inch or a 22 inch roll of tracing paper 25 yards long, graduated to inches and tenths as ordinates to represent feet and spaces as abscissae 1/10 inch apart, with every twenty-fourth line accentuated to represent time. The following scales for time and water heights are thus possible with the same paper:

Gage height scale.	Range obtainable without reversal of the pencil. 11 in. drum.	22 in. drum.	Inches of record for 1 foot of change in stage.
5:12	2 ft.	4 ft.	5 in.
1:6	5	10	2
1:12	10	20	1
1:24	20	40	½
1:4	40	80	¼
1:60	50	100	1/5

Time Scale.	Length of Record for one day	A 25-yd. roll of paper will last for
1/10 inch = 2 hours	1.2 inches	2 years
= 1 hour	2.4	1 year
= 30 min.	4.8	6 months
= 15 min.	9.6	3 months
= 10 min.	14.4	2 months
= 5 min.	28.8	1 month
= 2½ min.	57.6	15 days

Type C. This is similar in all respects to Type A except that the clock is spring driven and must be wound weekly. Fig. 1 shows the Type C Recorder.

Type F. This is a Duplex Recorder—producing two distinct graphs on the same record paper. It is used for submerged weirs, head and tail water of power plants, filter beds, canal locks, etc.

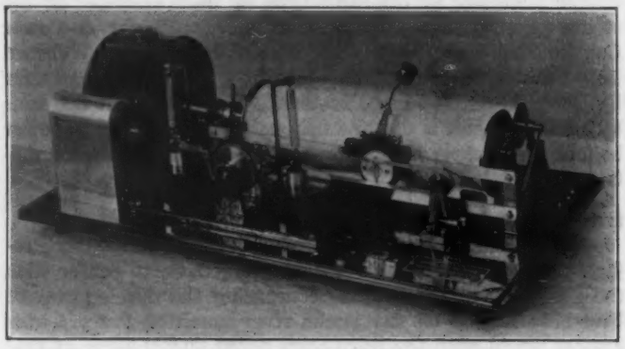
Type D is a Differential Recorder. It records the net difference in two water levels, for example, the net head on water wheels, loss of head in filter beds, head on submerged weirs, lock gates, etc.

Type E. This is a simple, inexpensive recorder intended for irrigation and similar service. It is made with three gage height scales, viz., 10:12, 5:12 and 1:6, and one time scale, 1¼ inches per day, and will accommodate ranges of stage up to 10 feet. The clock is wound and the record sheet changed weekly.

Type G. The Long Distance Recorder is similar to the Type A recorder except that the pen is moved by a pair of solenoids that are actuated by a distant sender placed over the water. A pair of wires or a single grounded wire is all that is required between the sender and recorder. A battery of 6 or more dry cells is placed at the sender. The instrument operates on the open circuit principle, only moving the pen when the water level changes a given amount. The line is connected to a poralized battery of 9 dry cells. In this manner the pen follows the changes of stage and produces the graph as accurately as if the instrument were placed directly over the water. It is not necessary to string line wires if there is an existing telephone line, either metallic or grounded circuit, between the points to be connected.

Type K. This is a Duplex Long Distance Recorder, where the graph is produced from two distinct and often widely separated sources. It as well as the foregoing types is made with 11 or 22 inch drums and has all the ranges of gage height and time scales given for the Type A recorder.

Where a Duplex Long Distance recorder is joined to a metallic circuit telephone line, all branches are isolated by condensers and two slow repeaters are placed at the recorder



Type C. recorder with spring driven clock

end to prevent ringing and static currents from operating the solenoids. Each wire of the telephone line is utilized, one for each sender, and the ground is used for a common return.

The illustration shows the sender used for all long distance instruments. A perforated brass tape with float and counterpoise attached operate the spine wheel, to the shaft of which is fastened two ratchet wheels.

By means of these and suitably arranged pawls a small hammer is drawn back and released at the passage of each ratchet tooth. The hammer, upon release, strikes a brass ball in the end of the inclosed tube, driving it forward into the tube. This tube tips about its pivot, causing two platinum points to dip into mercury cups, thus making contact between the sending battery and the line. One tube tips for a rising and the other for a falling stage, reversing the current in the line. Suitable locking devices and an interconnection of pawls insure one contact and only one when the stage changes the amount of the contact interval and prevents short circuiting of the batteries.

The Slow Repeater is a device that is interposed between the Relay and the Solenoids on the Recorder. The Sender operates the Relay through the line, the Relay operates the Slow Repeater and the Slow Repeater operates the Solenoids. The Relay will respond to all impulses on the line whether from the Sender, ringing generators or static discharges, but the Slow Repeater will only respond to the sustained direct current impulse from the Sender.

Instruments of these types are in use in all parts of the

United States and Alaska, in the Hawaiian Islands, India, Spain, South America, Russia and other European countries. They are manufactured and distributed by Lenpold Voelpel & Company of Portland, Oregon.

C-H SIDE OUTLET CURRENT TAPS

A short time ago The Cutler-Hammer Manufacturing Company of Milwaukee placed on the market a new porcelain side outlet "standard" current tap, having an Edison lamp shell and screw base. The side outlet, which is made with both multiple and series connections, has two parallel protected contacts. The arrangement of these contacts and the attaching cap employed conforms to the "standard" for plugs and receptacles adopted by six leading electrical manufacturers who by this move made the "Standard" attaching devices interchangeable. The C-H current tap is furnished either with or without a C-H "Standard" cap. The cap is made of Thermoplax insulation—a heat resisting material, which has ample strength to permit riveting of the contact blades. It has no thin or weak sections—the contact blades remain in permanent alignment and the appearance of the knurled finish is not spoiled by use.

LARGE TRANSFORMER FOR GOVERNMENT ORDNANCE PLANT

When the United States went into the business of making war a little over a year ago, it was found that there would be need for large quantities of electrical equipment. The electrical manufacturers were quick to co-operate with the government and many of the larger firms have been working ever since on government orders.

Large Transformer Ready to Ship

Among these The Packard Electric Company of Warren, Ohio, is filling large orders for auto ignition, lighting and starting cables for Liberty trucks and large special transformers for use in the cantonments and munition factories.

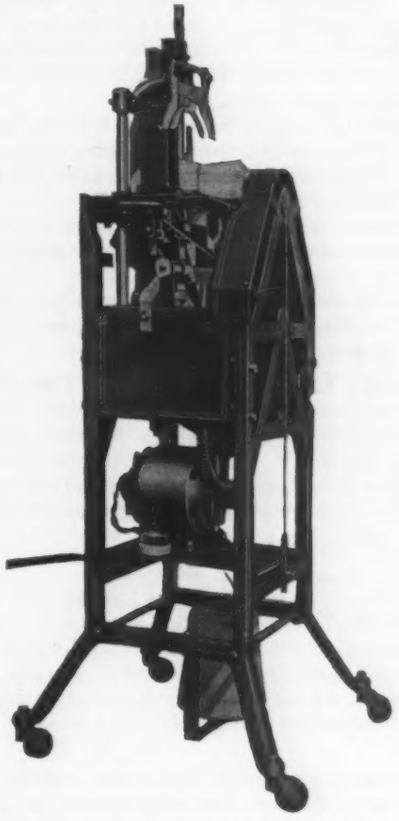
The photograph, taken as the instrument was about to be loaded for shipment, shows a monster high tension transformer built along special lines by the Packard people on government contract. It is one of an order of six made by this company to deliver power to one of the immense government ordnance plants.

Other Packard transformers are now being used to furnish power and light in in many of the large cantonments and training camps both in the United States and behind the battle lines in France.

PACKAGE TYING MACHINES

Neater and more uniform packages can be tied by the Bunn tying machine, made by B. H. Bunn & Company Chicago Ill., than can be done in the same time by five men. In fact, the accuracy and dependability of the machine has been so well proved that the United States Post Office Department has adopted it for tying letter mail.

The package tier is simple and very compact, occupying a space only one foot square. The motive power is a little



The Bunn Package Tying Machine which does the work of five men

Westinghouse motor located in the lower part of the machine. It can be attached to an electric light socket and uses but little current.

Each bundle is tied securely in the same way every time. A non-slip knot prevents the string from slipping and allowing the package to become loose. One wrapping only of the twine each way eliminates the waste of twine where several wrappings by hand process were ordinarily made. Thus much saving of labor and economy is effected by the use of this machine.

GOVERNMENT PUBLICATIONS

An interesting booklet has been published by the Government Printing Office at Washington outlining the work and the plan of the United States Tariff Commission. It gives a preliminary account of some of the problems to be met and enlists the cooperation of the public in solving them.

Another Government pamphlet, published by the National Committee on Public Utility Conditions, gives a review of holdings in recent cases of War Emergency Relief, as viewed by the State Public Service Commission. A supplement to this report brings the review of the field down to an approximately recent date.

The United States Department of Agriculture publishes, in Bulletin No. 704, a report on an investigation by Prevost Hubbard, chemical engineer, and Frank H. Jackson, Jr., Assistant Testing Engineer, in connection with the Bureau of Public Roads. It gives typical specifications for non-bituminous road materials, methods of testing, of selecting and shipping samples, etc.

BOOKS AND BULLETINS

Publications of the Bureau of Mines

The Bureau of Mines of the Department of the Interior has published a number of interesting bulletins which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Bulletin 132 is a treatment by Edwin Higgins, A. J. Langa, F. B. Laney, and George S. Rice of the problem of "Siliceous Dust in Relation to Pulmonary Disease Among Miners in the Joplin District, Missouri."

The monthly statement of Coal Mine Fatalities in the United States includes a list of permissible explosives, lamps and motors.

Technical Paper 194 publishes the Report of the Committee on the Standardization of Mining Statistics, compiled by Albert H. Fay.

Marine Lighting and Signaling Apparatus

The Benjamin Electric Manufacturing Company has published an attractive booklet on "Marine Lighting and Signaling Apparatus." Since the Benjamin apparatus is in general use in the shipbuilding industry, anyone who is interested in America's great shipbuilding program will find its publication worth the reading.

A New Bulletin

"Some Facts on How to Run a Furnace and Save Coal," published by the Western Electric Company, is rather unique as a selling piece of literature, for practically only two pages are devoted to describing the apparatus, whereas ten pages are devoted to explaining to the householder how to keep her home comfortable and at the same time to economize on the fuel.

Popular Lecture on Protective Lighting

The third of a series of popular lectures prepared under the auspices of the Committee on Popular Lectures of the Illuminating Engineering Society, is now ready for presentation. It is entitled "Protective Lighting" and treats of the use of light as a means of defense against damage to the industrial and military machinery of the country, resulting from sabotage and acts of enemy agents in general. The treatment of the subject is popular throughout. The lecture is illustrated by thirty-four lantern slides, and can be presented in an hour's time.

Mailing Lists

A catalogue of guaranteed mailing lists, including photographs of the company offices, has been issued by Ramsey Oppenheim Company of San Francisco. It should be helpful to business men interested in direct mail advertising.

General Electric Appliances

The Edison Electric Appliance Company has issued a series of booklets on General Electric Appliances—two small leaflets on "General Electric Irons" and "The Matchless Kitchen," four larger technical pupblications, "General Electric Heating Appliances," "Polyphase Induction Motors," and "Type FK-20 Oil Circuit Breakers for Industrial Serivice," and finally, a very interesting report of Geo. A. Hughes' address before the Minneapolis Electrical Association on "Electricity, the Nation's Conservator."

Universal Dealers' Sales Helps

Landers, Frary & Clark, of New Britain, Conn., have published a pamphlet on "Universal Dealers' Sales Helps," which illustrates the company's window cut-outs, display cards, window display material, street car cards, lantern slides, stamps, newspaper ads and leaflets. It should be useful to the dealer who is cooperating in the turnover of Universal products.

Magnet-Operated Brakes

The Cutler-Hammer Manufacturing Company has published a descriptive booklet, "Magnet-Operated Brakes for Direct Current Service," which explains recent improvements in design, and lists ratings, dimensions, engineering data, standard size, etc. Three envelope folders, "C-H Electric Laundry Irons," "The Seventy Fifty Switch" and "Snap Switches that are Different" have been issued by the same company.

New Open Price Competition

An address delivered by Mr. Herman Plaut at the meeting of Metal Products and Lighting Fixtures Trades, Inc., on April 26, 1918, has been published in booklet form by the Institute of Lighting Fixture Manufacturers of New York City. The speaker discusses the operation of the New Open Price Competition as practiced by the Institute.

Hubbell Attachment

An envelope folder describing the Hubbell Attachment for pull sockets has been printed for use by contractor-dealers.

From the Falls to the Factory

A treatise on electrical power transmission, entitled "From the Falls to the Factory," has been prepared by the British Aluminum Company of London, England. The publication has been designed with special reference to American practice in Transmission Line Engineering.

Acorn Electric Ranges

The Rathbone Sard Electric Company has issued a little booklet on their Acorn Electric Ranges which includes fifteen wartime cooking suggestions by Alice Bradley.

University Bulletins

Engineering Experiment Station bulletin No. 7, published by the University of Illinois, discusses fuel economy in the operation of hand fired power plants. It outlines the sources of fuel, principles of firing, boiler installation, draft conditions, feed water heating, steam piping requirements, and concludes with a plea for the keeping of a systematic Record of Operation in connection with every plant.

The University of California Agricultural Circular No. 202, prepared by Woodbridge Metcalf, describes the need for county organization for rural fire control and outlines a practical plan.

The Engineering Experiment Station of the University of Illinois publishes, in Bulletin No. 103, an illustrated report upon an investigation of Twist Drills, conducted by Bruce W. Benedict of the University Shop Laboratories, and W. Penn Lukens, Research Fellow in the Engineering Experiment Station.

How to Sell Electrical Labor-Saving Appliances

compiled by Electrical Merchandising, from articles appearing in its monthly issues; size 5x8 inches; 115 pp.; published by McGraw-Hill Book Company, Inc., and for sale by the Technical Book Shop, San Francisco. Price $1.00.

This little book presents to the electrical store 119 tested plans for selling electrical labor saving appliances. The book has ideas for every one in the retail business. It begins with the question of window appeal, discussing forty-five different plans for attracting the attention of the passer-by. The compilers of the articles have found selling possibilities in even the skillful laying out of the store and the clever utilization of store furniture. The question of the retail dealer's advertising could only be touched upon, of course, in a book of this size, but the chapter has some fruitful suggestions for the alert merchant. Practical plans for getting prospects and for conducting follow-up campaigns with demonstrations have been supplied from the actual experiences of successful merchants, and these are followed by a convincing demonstration of the value of training salesmen to conduct these follow-ups. The book concludes with a plea for carefully planned sales campaigns and for intelligent management of small details in the store.

NEW ELECTRICAL DEVELOPMENTS

(Power developments in the Northwest, a probable revision of the electric sign order in San Francisco and a less stringent power restriction in the Pacific Central District, electricity in irrigation in the Southwest and new mining operations in Montana with an electrically run ferro-manganese plant in prospect, are among the principal developments of the last two weeks.—The Editor.)

THE PACIFIC NORTHWEST

PASCO, WASH.—A proposition has been made by the Pacific Power & Light Company to the city to substitute incandescent street lights for the arc lights now in use.

SEATTLE, WASH.—The Skinner & Eddy Shipbuilding Corporation has taken out a permit to erect a $20,000 power house on their premises at 1201 Railroad Avenue South.

VANCOUVER, B. C.—The Tudhope Electric Metals Company has awarded a contract for the construction of an electric foundry to the Cotton Company, Ltd. The main building will be 100 by 50 feet.

CRESCENT, ORE.—The development of a power site at this place has been undertaken by Dr. N. E. Winnard of Heppner. The power is to be used in pumping water on lands in the Fort Rock district.

FLORENCE, ORE.—A movement is now under way that may result in the building of another sawmill at Florence. It is proposed to form a stock company for the purpose of building and operating a sawmill, light and power plant.

PORTLAND, ORE.—In order to comply with an additional order of the Fuel Administrator to save "dead car mileage," the Portland Railway, Light & Power Company will change the routing of the Vancouver cars beginning at once.

PORTLAND, ORE.—In keeping with the recommendations received by him from Washington, Fred J. Holmes, fuel administrator for Oregon, has ordered the Portland Railway, Light & Power Company to put the skip-stop street car service into operation as soon as possible.

PORTLAND, ORE.—The city council has granted the Portland Railway, Light & Power Company permission to install tracks with a view to operating a loop system for the relief of the South Portland shipyards. The plan was recommended by the Emergency Fleet Corporation.

SEATTLE, WASH.—To take care of increased business, reduce the running time and increase the factor of safety, 250 feet of single track of the Ballard branch of the municipal street car line at the south end of the Fifteenth Avenue Northwest bridge will be double tracked

TACOMA, WASH.—The city of Tacoma, Washington, recently voted to give the Stone & Webster interests 1,500,000 kilowatts of power in the expectation that the city may need some kilowatts later, in which case the Stone & Webster people promise to reciprocate with 1,125,000 kilowatts.

SEATTLE, WASH.—Another unit will be added to Seattle's extensive municipal street car system by the sale of the Seattle & Rainier Valley Railway Company's properties to the city. Marshall E. Sampsell of Chicago, president of the company, is here to arrange details of the sale.

SEATTLE, WASH.—Engineers of the East Waterway Dock & Warehouse Company have completed plans for construction of a reinforced concrete power house 42 by 42 feet in size, one story in height, to be erected at the plant of the Rogers-Brown Importing Company on the East Waterway.

SEATTLE, WASH.—The war department has ordered the installation of an additional wire between this city and Port Angeles and the installation of a new cable between Port Angeles and Victoria, B. C., under the Strait of Juan de Fuca. The sum of $120,000 will be expended for this cable service. The government has taken over the city dock at Port Angeles for the handling of the new cable.

HOOD RIVER, ORE.—For the protection of its water rights on Hood River, and ostensibly for development after the war, the Pacific Power & Light Company, Portland, has purchased a number of power sites between a point about 25 miles south of Hood River, and the mouth of the river. Survey has been made for a pipe line from a dam site near Wynans to Ruthton. Rights of way have also been secured.

DAVENPART, WASH.—The Commissioners of Adams County have granted the Intermountain Power Company a franchise to erect an electric transmission line from Long Lake southward through Lincoln to a connection with the Milwaukee Railway in Adams County. The Washington Water Power Company of Spokane, from which the Intermountain Company secures its power, has agreed to have its new unit at Long Lake ready by May 1.

SEATTLE, WASH.—The city will purchase during each of the next three years 36,000,000 kilowatt hrs. of surplus hydro-electric power from the Puget Sound Traction Light & Power Company, paying half a cent per kilowatt. The capital issues committee has demanded this interconnection of power between the company and the city during the development of the 35,000 kilowatt power unit dam on the Skagit Canyon. The interconnection will cost $75,000 and will be paid for by the city.

SEATTLE, WASH.—H. K. Owens, consulting engineer of Seattle, has submitted a proposition to Mayor Hanson for the development of the Cedar River power plant to twice its present capacity. This proposal is submitted as a possible means of getting more electric power in not to exceed a year and at a reasonable rate. Mr. Owens states that the Skagit, the Cedar River or any other power project will cost 100 per cent more now than it will after the war and by improving the city plant at Cedar Falls all requirements during the war period can be met at an expenditure of one-third of the cost contemplated on the Skagit and a saving of from $2,000,000 to $3,000,000 in the first cost on the Skagit River by waiting until after the war.

THE PACIFIC CENTRAL DISTRICT

BUTTE CITY, CAL.—The Great Western Canal Company will build a power plant to develop 500,000 h.p.

MANTSCA, CAL.—The trustees have ordered a siren first alarm system installed for the town. The cost of such a system will be $385.

TUOLUMNE, CAL.—The big electric storm which hit Tuolumne nearly annihilated the electric generator at the power plant of the West Side Lumber Company.

SYCAMORE, CAL.—The Pacific Gas & Electric Company is building a construction camp here to accommodate thirty men, who will run a power line through here from the Northern California power line, north of Colusa, to Knight's Landing.

OAKLAND, CAL.—Consolidation of the post office and telegraph system has been started, according to word received by Joseph L. Rosborough, Oakland postmaster. According to instructions, wherever it is feasible the two will be concentrated in a single building and overhead expenses lessened.

SACRAMENTO, CAL.—Power Administrator Butler has removed all restrictions in the use of power by gold dredgers, cement plants, sand and gravel and crushed rock plants. The order is for 30 days. If there is no more rain in the mountains he will have to reimpose the restriction, said Butler.

SAN FRANCISCO, CAL.—In response to the suggestion of the building superintendent, the public safety committee has recommended modifying the building ordinance so as to permit the erection of 5-foot electrical wooden signs on the top of wooden buildings in fire district No. 5 or the area outside of the central business district.

SAN FRANCISCO, CAL.—The proposed charter amendment that will make possible the purchase of the United Railroads by the city on the installment plan was introduced in the Board of Supervisors a few days ago by Supervisor Andrew J. Gallagher. The amendment as proposed was referred by the Supervisors to its judiciary committee.

SAN FRANCISCO, CAL.—The advance of more than $500,000 has been made by the Government, through the Emergency Fleet Corporation, to the Key Route System in order to buy new cars. The title to the cars will be vested in the Emergency Fleet Corporation, which will lease them for operation by the railroad.

SAN FRANCISCO, CAL.—A claim for $4,825,380 was presented to the city by Jesse D. Lilienthal, president, and William M. Abbott and W. M. Cannon, attorneys, representing the United Railroads. Alleged injury received by the United Railroads through the construction of the Municipal Railways and the operation of the city's street cars on the outer tracks on Market street, is the basis of the claim.

OAKLAND, CAL.—Work on the concrete shipbuilding yard on Government Island, at the foot of Dennison street in Oakland, where the Government's concrete tankers will be built, is rapidly nearing completion. A wide trestle connects the island with the Oakland shore. Complete fire protection and sanitary conditions as well as water, gas and telephone systems have been installed on the island. The entire plant, it is said, will cost close to $1,000,000.

BERKELEY, CAL.—No more "express" electric trains will be operated through Berkeley by the San Francisco-Oakland Terminal Railways if the recent order of the city council is carried out. Commissioner Charles D. Heywood was instructed to communicate with the companies and order all electric trains to stop at all stations. A special order to operate the Ellsworth street line more slowly between stations, for greater safety, will be sent.

ONTARIO, CAL.—Ontario Power Company has been granted permission by the State Railroad Commission on its application to erect a large power plant in San Antonio Canyon. It is planned to utilize the water from San Antonio Creek. Arrangements are being made with the Southern California Edison Company whereby the latter company will take all energy generated which is not absorbed by the Ontario company during the first five years of the contract. The plant is estimated to cost about $65,000.

THE PACIFIC SOUTHWEST

SAN DIEGO, CAL.—The completion by next spring of a telegraph line from here to El Centro along the San Diego & Arizona Railway is assured, with work on the project already begun.

SAN DIEGO, CAL.—Bids have been received by the naval officer of public works, in the Timken Building, for construction and installation of electrically operated doors for the fabricated steel dirigible hangar at the naval air school at North Island.

SAN DIEGO, CAL.—In connection with the construction of the proposed new marine brigade post on Dutch Flats by the Government, estimated to cost $1,500,000, arrangements have been completed for the installation of an electric lighting system. It is planned to commence active construction work about October 1.

LOS ANGELES, CAL.—Pacific Electric Railway Company has been granted permission by the city council to construct and operate a new line to connect its Ionia avenue-Hawthorne system with the line extending from Delta avenue to San Pedro, via Gardena.

LOS ANGELES, CAL.—In connection with the proposed new irrigation system to be installed by the Palmdale Irrigation District in Antelope Valley, a number of pumping stations will be constructed, to be operated, it is understood, by electric power. The entire work, it is estimated, will cost approximately $550,000.

LOS ANGELES, CAL.—Because it has used up its allowance of fuel oil and electric energy, the California Portland Cement Company, whose plant at Colton, sixty miles east of here, was said to be the largest cement mill in the Southwest, has suspended operations, according to an announcement made here by T. J. Fleming, secretary and general manager. Fleming said the company expected to resume operations next January.

LOS ANGELES, CAL.—The department of public service of Los Angeles will start at once the erection of a large power plant at Haiwee reservoir, about twenty miles from Owen Lake, on the Los Angeles Aqueduct. The new plant will cost about $60,000 and will be in operation about January 1, 1919. Machinery for the plant has been provided by the purchase of generators and other equipment made for a power plant projected at Marble Falls, Tex., which was abandoned.

SAN DIEGO, CAL.—Work of constructing an extension of the street railway line from the Logan Avenue line out 32nd street, to the new concrete shipbuilding plant, will probably begin in the near future, as the city council has adopted a resolution giving the United States Shipping Board Emergency Fleet Corporation, which will furnish money for the construction of the line, permission to go ahead with the work of laying the tracks on 32nd street at once, pending the granting of a franchise for such a line.

THE INTER-MOUNTAIN DISTRICT

COEUR D'ALENE, IDAHO.—In order to do away with steam as a motive power in the Northern Pacific yards, the road is being electrified within the city limits.

OGDEN, UTAH.—It is proposed to build a reservoir on the Weber River near Echo to cost about $3,000,000. The water will be used on lands from Clinton to the Salt Lake county line.

MISSOULA, MONT.—The Missoula Street Car Company is to erect a steel and concrete bridge at once over Rattlesnake Creek at East Pine street. The contract for the concrete work has been awarded to the Forseen & Settergreen Company, local.

GREAT FALLS, MONT.—The Montana Power Company has started work upon a high-tension power line into Conrad and Choteau. The line will carry a voltage of 50,000, will be 32 miles in length and cost about $50,000. Work will be completed in November.

GREAT FALLS, MONT.—By November 1, cars will be operating to the new wire mill of the Boston and Montana smelter of the Anaconda Copper Mining Company. Contract for erection of the line has been awarded to Fitzgerald & Staunton by the Montana Power Company. The wire for the overhead work as well as the ground wires will be made in the new wire mill to which the extension is being constructed.

GREAT FALLS, MONT.—Operations have been started at the ferro-manganese plant at the Boston and Montana Reduction Works of the Anaconda Copper Mining Company. The plant cost above $500,000, consists of five electrically heated furnaces, and when all are operated, with 85 men employed, will produce 90 tons of ferro-manganese daily or sufficient to treat 10,000 tons of steel. The entire output has been contracted for by the United States Government for an indefinite period.